STOCK PRICE RESPONSE TO EARNING ANNOUNCEMENTS:

EVIDENCE FROM TANZANIAN STOCK MARKET

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CERTIFICATION

The undersigned certify that they have read and hereby recommend, for acceptance by the Open University of Tanzania a thesis entitled **"Stock price response to earning announcements: Evidence from the Tanzanian stock market,"** in fulfilment of the requirements for the award of Degree of Doctor of Philosophy, Department of Accounting and Finance of the Open University of Tanzania.

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DECLARATION

I, **JAMES CHARLES KALANJE,** declare that the work presented in this thesis is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in fulfilment of the requirement for the Degree of Doctor of Philosophy.

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Signature

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Date

DEDICATION

This work is dedicated to my beloved wife Juliana for her devoted LOVE, CARE and CONCERN.

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ABSTRACT

The purpose of this study was to examine the extent to which stock prices respond to public earnings information by companies listed on the Dar es Salaam Stock Exchange, Tanzania. Specifically, the study assessed the abnormal returns around companies' public earnings announcements the purpose of which was to determine whether the stock market was efficient in the semi-strong for. Moreover, the study determined whether such abnormal returns can be explained by firm characteristics (firm age, size and industry) and earning characteristics (positive change in earnings). Guided by the positivism philosophy with a deductive research approach, the study employed a quantitative method with an explanatory research design. Data were collected from the Dar es Salam Stock Exchange. A total of 167 events were obtained, 88 of which had sufficient trading data for the analysis. An event study methodology was applied to estimate the abnormal returns around the event days using the DSE-All Share Index and Tanzania All Share Index prices as measures of expected returns. A standard linear multiple regression analysis technique was used along with a stepwise multiple regression analysis technique to test for the effect of the four explanatory variables. Wild bootstrapping with a thousand samples was also used for robustness analysis to control for sample size but also the non-normality and heteroscedasticity problems in the regression residuals. The results show that significant abnormal return exists on post-event days. The firm's age and the financial sector significantly negatively explained the variance in the cumulative average abnormal return over the 5-day and 11-day event windows. Firm size significantly and negatively explained the variance in the cumulative average abnormal returns over the 21-day window. These results are consistent irrespective of whether DSEI- or TSI-based price data are used. It can be concluded that DSE is inefficient in the semi-strong form and that the size of this inefficiency is mainly explained by the firm's age and firm's operating sector in the shorter event windows (5- and 11-day) and firm size in the longer window (21-day). It is therefore recommended that regulators and policymakers in frontier markets take necessary reforms to improve information flows, institutional frameworks, and market transparency to improve their efficiency.

Keywords: Frontier markets, Annual Earnings announcement, stock price reaction, Abnormal returns, semi-strong market efficiency, Event study, Tanzanian Mmarket.

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AAR	Average Abnormal Return
AltX	Alternative Exchange
CAAR	Cumulative Average Abnormal Return
CAPM	Capital Assets Pricing Model
CMSA	Capital Markets and Securities Authority
DSEI	Dar es Salam Stock Exchange All Share Index
EMH	The efficient-market hypothesis
FTSE	Financial Times Stock Exchange
GSM	Ghana Stock Market
JSE	Johannesburg Stock Exchange
OLS	Ordinary Least Squares
TSI	Tanzania All Share Index
TZS	Tanzanian Shillings

CHAPTER ONE

INTRODUCTION

1.1 An Overview

The objective of this chapter is to introduce the study. It begins with the background information of this study, followed by the statement of the research problem in Section 1.3. Section 1.4 presents research objectives while research questions are provided under Section 1.5. The relevance of the study and the organization of the research proposal are presented in Sections 1.6 and 1.7 respectively.

1.2 Background to the Study

Stock price response is a change in stock price resulting from the incorporation of new information introduced in the market (Fama, 1970). When a company's new information is revealed, rapid and rational assimilation of it into the stock prices will take place bearing in mind the size and direction of the motion (Arnold, 2019). Owido et al. (2013) contend that security prices reflect publicly available information about the firm and its securities at any given point in time since they react quickly to new information.

Among the new information that companies announce to the market is earnings performance (Miescu & Mumtaz, 2024). Earnings announcements refer to the declaration of the financial performance of a company to the public (Eleke-Aboagye & Opoku, 2013). The declaration is provided through the company's published financial statements within a specified period. Through these declarations, information is given to investors about the profits and wealth of the company (Olang & Akenga, 2017) as well as about its future outlook (Kiremu et al., 2013).

Earnings information helps investors estimate the performance of the company in the future and select investment portfolios (Mlonzi et al., 2011). Lack of this information makes stock prices uncertain, leading to a questionable future outlook for the company, which in turn makes the decision to buy and hold or sell its stocks difficult (Miescu & Mumtaz, 2024). Thus, the effect of earnings announcements on stock prices in the capital markets is a major concern to investors, since it affects the shareholder's wealth and helps them arrive at various decisions. Consequently, the

magnitude and speed of stock prices' response to new information brings about the concept of stock market efficiency, which refers to how information is reflected in stock prices (Afego, 2015).

The efficient-market hypothesis (EMH) is a theory in financial economics which argues that stocks always trade at their fair value, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices (Fama, 1970). Fama (1970) identifies three forms of market efficiency. These are the weak form efficiency (where the current stock price contains only historical information about the company); the semi-strong form (where the current price reflects all publicly available information); and the strong form (where the current price contains all available information - both public and private). Thus, focusing on the semi-strong market efficiency, the theory states that an asset's market prices reflect all publicly available information and that no one will be able to consistently outperform the market on a risk-adjusted basis as the market prices react instantaneously and in an unbiased manner to new information (Fama, 1970).

Past research has examined this theory across stock markets in relation to various information sets (events) and produced vast, but inconclusive and at times, controversial evidence (AlHajraf, 2021). Beginning with the seminal work by Beaver (1968) and Ball and Brown (1968), the empirical literature on stock price response to information disclosure is vast and covers a wide range of information disclosures. Sample disclosures covered include but are not limited to, dividend

announcements (Kumar, 2017; Soesato et al., 2021), macroeconomic policy changes (Ngugi, 2003), and financial innovation regulations (Yang & He, 2019).

Of importance to the present study are the studies that examined market efficiency in relation to earnings announcements as an information set. Even with this group of studies, the available empirical evidence is mixed, more supportive of the hypothesis in the developed than in the developing markets. For example, studies in support of the hypothesis include Kiremu et al. (2013), Messo and Byaruhanga (2019), and Olang and Akenga (2017) in developing markets. Conversely, studies that are not supportive of the hypothesis include Sponholtz (2005) in developed markets and Afego (2015), Dangol and Bhandari (2019), Kumar et al. (2020), Mlonzi et al. (2011), Osei (2002), and Syed and Bajwa (2018), in the developing markets.

Although the studies in the developing markets above covered Africa, the Middle East and Asia, most if not all were carried out in the emerging markets. Thus, there is a paucity of such studies of market efficiency with respect to earnings announcements in the frontier markets (Bouzid & Makala, 2020), Tanzania included. Most studies in the developing markets have reported evidence of inefficiency, and this has been attributed to varied reasons including being less sophisticated, highly illiquid, poorly regulated, lacking resources to cover their intensive analysis, a large number of poorly informed and unsophisticated investors, weak legal regulatory and institutional frameworks, and poor operational bottlenecks (Osei, 2002). See also Ellis and Keys (2014) for more discussion of these factors. The literature also points to contrasting market systems analysis methods (AlHjraf, 2021), low competition, lack of

transparency, fragmentation, and political uncertainty (Lagoarde-Segot & Lucey, 2008).

Tanzania established a stock exchange - The Dar es Salaam Stock Exchange (DSE), in 1996 following the enactment of the Capital Markets and Securities Authority (CMSA) in 1994. The DSE was incorporated in September 1996 as a private company whose liability is limited by guarantee. It effectively became operational on 15th April 1998 with the listing of Tanzania Oxygen Limited (TOL) as its first product. There are 28 companies listed with a market capitalization of TZS 21,767.00 billion (USD 9,970.46 million) and a turnover of TZS 733.66 billion, as of June 2016. As of August 2019, the market had six outstanding corporate bonds valued at TZS 176 billion. The listed companies include both domestic and foreign companies, six of which are cross-listed from Kenya and one from the UK (DSE, 2021)

Since its establishment, the DSE has increased the number of products and created public awareness. It has undergone various key reforms in an attempt to increase its efficiency level and attract investors. Some of such reforms include, but are not limited to, the deployment of an Automated Trading System on the Wide Area Network, the start of remote trading by brokers, and the joining of the World Federation of Exchanges, supporting the United Nations Sustainable Stock Exchanges initiative. Besides joining membership in regional and world stock exchanges, DSE qualified for recognition/ classification as a frontier market in 2020.

All the above-mentioned efforts were geared towards making DSE more efficient, though little is known about how efficient DSE is to date. Among the few studies that investigated DSE's efficiency are Guney and Komba (2016), Njuguna (2016) and Katabi and Raphael (2018). However, all these studies focused on the weak form market efficiency based on the random walk theory, leaving the semi-strong market efficiency untapped, except for the work of Lotto (2023) who focused on the stock price reaction to dividend announcements.

This study therefore is designed to assess whether DSE is semi-strong efficient with respect to earnings announcement as an information set. In addition, it contributes evidence to semi-strong market efficiency literature in frontier markets by showing whether significant abnormal returns exist around earnings announcements by the listed companies. The study has also been extended to explain whether such abnormal returns are attributable to firm and earnings characteristics. In particular, firm size, firm age, industry, and earnings change.

1.3 Statement of the Research Problem

Developing markets are often faced with challenges in transparency, information integration, and efficiency due to market anomalies and volatile information, causing asset prices to deviate from their fundamental value (Yuliana et al., 2024). However, Capital markets being the backbone of the economy, are expected to be functioning efficiently (Marisetty & Madasu, 2021).

The establishment of the Dar es Salaam Stock Exchange (DSE) aimed at providing not only an avenue for companies to raise much-needed long-term capital but also at providing a market for the listed securities, trading on which would reduce the cost of capital by providing liquidity, price discovery and a risk transfer capability. The establishment was also meant to facilitate privatization and attain a wider ownership of shares in privatized public enterprises. Through the market, individuals, companies and government can access capital from the public and most importantly, transform Tanzanian people and other participants towards a culture of savings and investment (DSE, 2016).

The right information about stock price is very crucial to participants of the market in arriving at various decisions (Marisetty & Madasu, 2021; Monga et al., 2023). For instance, investors and portfolio managers, keen on increasing their portfolio returns, would be interested in the identification of opportunities for profit by trading around companies' earnings disclosure dates in developing markets (Afego, 2015) and around various other economic disclosures by the regulator and/or the government. Stock market inefficiency, on the other hand, concerns policymakers and regulators, since it implies less-than-optimal allocation of investment resources within the economy. To ensure that the capital market performs these roles, various reforms have been implemented over time by the DSE since its incorporation in 1996. However, similar to other markets in Africa (Afego 2015), there is limited information about whether DSE is semi-strong efficient with respect to information sets, especially earnings announcements. To contribute to this gap, this study seeks to answer several questions on whether the Tanzanian market is efficient in the

semi-strong form with respect to earnings announcements. These are; How quickly do prices react to new information? (Fu, et al., 2023; Turguttopbaş & Omay, 2023). Can investors possibly make significant abnormal returns following such announcements? (Smerkolj & Jeran, 2023). What factors can explain the observed variability in the abnormal returns? This study, therefore, assessed the informational efficiency of the DSE with respect to firms' earnings information releases and served to fill the gap of unknown price responses in the market by addressing the posed questions. The study also determined the firm and event-level characteristics that can explain the observed abnormal returns.

1.4 Research Objectives

1.4.1 General Research Objective

To examine stock price responses to earnings information made available to the market by companies listed on the DSE.

1.4.2 Specific Research Objectives

(i) To evaluate the abnormal returns around companies' public earnings announcements

(ii) To determine the effect of firm age on the abnormal returns around earnings announcements

(iii) To determine the effect of announcing firm size on the abnormal returns around earnings announcements

(iv) To determine the effect of announcing firm industry on the abnormal returns around earnings announcements

(v) To determine the effect of the change in earnings on the abnormal returns

around earnings announcements

1.5 Relevance of the Research

This is an event study which focuses on examining whether earnings announcements contain value-relevant information and whether stock markets react quickly and efficiently to this information (semi-strong efficiency). The study follows the EMH testing studies in which there have been debates between the hypotheses' supporters (Olang & Akenga, 2017; Messo & Byaruhanga, 2019) and challengers (Dangol, & Bhandari, 2019; Kumar et al., 2020; Syed & Bajwa, 2018). However, most of the studies involved in these debates were carried out in developed and emerging markets. Theoretically, the findings of this study contribute to the debate on whether EMH holds, particularly in frontier markets (DSE). Contextually, the study is contributing to knowledge about the EMH from a frontier market.

Practically, the evidence generated is of use to DSE participants; e.g. Investors, speculators, arbitrageurs and regulatory authorities. Information obtained leads DSE participants to either take advantage of market inefficiency as a possibility of making abnormal returns exists or exercise precaution before investment decisions. Furthermore, finding evidence of relationships between abnormal returns and firm characteristics enhances the interpretation of such abnormal returns by various stakeholders. Last, but not least, the findings would provide feedback to the regulator of the industry in this case the Capital Markets and Securities Authority (CMSA).

1.6 Organizational of the Study

The remainder of the thesis is organized as follows: The second chapter presents a literature review which covers conceptual definitions, a review of both theoretical and empirical literature that illuminates the present study and comes up with both the research frontier and the research gaps and ends up with a conceptual framework and hypothesis statements. Chapter three provides research philosophy and research design and clarifies methods of data collection, data processing and analysis. Chapters four and five present findings and discussion of the findings respectively, while Chapter six ends the thesis by providing its conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 An Overview

This chapter presents the results of the review of literature on the topic. It begins with conceptual definitions followed by a review of both the theoretical and empirical literature. Lastly, it presents the research gaps, conceptual framework and hypothesis statements.

2.2 Conceptual Definitions

2.2.1 Earning Announcements

An earnings Announcement is the official declaration, to the public, of the financial performance of a company for a definite period, usually a quarter or a year (Eleke-Aboagye & Opoku, 2013). The statement discloses how a company has performed in

the reporting year and it compares that performance with the performance of the year preceding the reporting year. Earnings announcements may affect the company's stock price favourably or adversely depending on investors' perception of the released information. The number of these announcements constitutes the population of the present study.

2.2.2 Stock Price Response

A stock price is the price of a single stock or several saleable stocks of a company, derivative or other financial asset. It is the highest amount someone is willing to pay for the stock or the lowest amount that it can be sold for. Thus, stock price response is a change in stock price resulting from the incorporation of new information introduced in the market (Fama, 1970). In this study, the focus is the change in stock price resulting from earnings announcements relative to normal prices.

2.2.3 Abnormal Return

Abnormal return refers to the difference between the returns generated by a given security or portfolio over a period of time and the expected (normal) rate of return, over the same period of time, for a given level of risk. These abnormal returns are important in determining a security's or a portfolio's risk-adjusted performance when compared to the overall market or a benchmark index. In the present study, abnormal returns constitute the differences between expected and actual returns over the event window (MacKinlay, 1997).

2.3 Market Efficiency and the Efficient Market Hypothesis

Market efficiency refers to the degree to which market prices reflect all available, relevant information (Fama, 1970). The necessary assumptions for efficiency include the non-existence of transaction costs in securities trading, availability of all information to market participants at zero cost, fixed investment policy and market participants' agreement on the meaning of current information, current price and the future price of each security distribution (Manzoor, 2015). Based on the type of information set involved, three forms of market efficiency are identified weak, semi-strong and strong forms. (Fama, 1970).

In the weak-form efficiency, asset prices on the market already reflect all information contained in past stock prices. In the semi-strong form, both the historical and public information about the company are incorporated into the current share price, while the strong form efficiency reflects all available information.

This study aims to test EMH theory in its semi-strong form. The study argues that if the stock market in Tanzania is semi-strong efficient then it will be impossible for investors to “beat the market” because stock market efficiency causes existing stock prices to always incorporate and reflect publicly available information (Malkiel, 2003).

2.4 Theoretical Literature Review

2.4.1 Efficiency of Stock Markets

A well-functioning securities market is expected to be efficient internally; and react quickly to the latest information brought to the market in a timely and accurate way. Assets can be bought or sold easily and quickly since there are many buyers and sellers giving strength to the market. Thus, unless significant news is made available to the market, changes in prices from one transaction to another are expected to be insignificant as existing prices instantaneously reflect publicly available information.

Externally, efficiency is centred on the argument that the stocks always trade at their fair value. Thus, neither expert stock selection nor market timing will make it feasible for investors to outshine the overall market, rather higher returns can possibly be obtained by chance or by acquiring riskier investments (Fama, 1970).

2.4.2 Evolution of the Efficient Market Hypothesis

Since its inception, there have been a number of both proponents and opponents of EMH theory. For instance, Scholes (1972) found that the market is efficient with respect to the announcement of secondary offerings, except for some indications of post-event price drift. Similarly, Jensen (1978) argued in favour of efficiency by showing that EMH has more solid empirical evidence to support it than any other proposition in economics. On the contrary, Ball (1978) discovered consistent additional returns after public firms' earnings announcements.

Grossman and Stieglitz (1980) argued that information is costly in terms of resources spent on obtaining and analyzing it; hence it is impossible for a market to be perfectly informationally efficient. Conversely, Ederington and Lee (1995) in their examination of the information content of macroeconomic news releases concluded that EMH holds. Other similar studies concluded the same, e.g. Fifield et al. (2002).

Wilson and Marashdeh (2007) stress that stock market inefficiency in the short run ensures stock market efficiency in the long run. Their emphasis was based on the elimination of arbitrage opportunities over time and thus, establishing an inconsistency between co-integrated stock prices and EMH in the short run, while demonstrating consistency in the long run. Fama and French (2012) confirmed EMH holds, through their study that show the close similarity between the distribution of abnormal returns of US mutual funds and what would be expected in the absence of fund managers' skill.

Manzoor (2015) contended that; "there are many pieces of evidence which are consistent with the previous studies that markets are a strong form efficient, but in some cases due to emotional and cognitive biases, market anomalies exist in prices and returns, as the results show that markets do not always perform efficiently".

2.4.3 Theoretical Gap

This topic is still debatable, as some studies confirm the semi-strong form of EMH to hold, while others reject it. The review reveals that some papers argue for it,

while others argue against the EMH. The proponents agree that asset prices fully reflect all relevant available information, which is not the case for the opponents. The argument that there is a minimum or no cost in terms of resources spent on obtaining and analyzing information and that a change in prices from one transaction to another is insignificant as existing prices fully reflect all available information makes the latter believe that there is no possibility of any real market to be efficient. In this scenario, I also concur with them. Despite the critics directed to the EMH, lack of consensus between proponents and opponents to EMH attracts more studies to test and re-test the theory, especially in frontier markets, Tanzania included, since most carried out studies focused on developed and emerging capital markets.

2.5 Empirical Literature Review

2.5.1 Stock Price Response to Announcements in Western and Middle East

Generally, earlier studies on the relationship between security returns and the release of companies' announcements focused on the impact of dividends, stock splits, issue of new shares and earnings announcements (Beaver, 1968; Ball & Brown, 1968). The later studies deviate from the early ones as they focused on the treatment of information contained in annual income statements. Some have scrutinized the reactions of prices to the information content of earnings disclosures (Pope & Inyangete, 1992) while others look at the information content related to pronounced macroeconomic news (Ederington & Lee, 1995; Fifield et al., 2002).

Dangol and Bhandari (2019) rejected the semi-strong form of EMH in the Nepalese stock market following earnings announcements. They established an increase in the stock price for good news announcements and a decrease of the same for bad news announcements that lead to strong positive and negative average abnormal returns respectively. Similar results are reported on the Saudi Stock Exchange (Kumar et al., 2020; Syed & Bajwa, 2018).

Odendaal (2014) used a sample of semi-annual earnings announcements by 44 companies listed on the FTSE 100 index (the top 100 biggest securities traded in the UK) over the period from 1st January 2010 to 31st December 2012. Applying the market model for computing normal returns, the study revealed no abnormal returns and concluded the market is in a semi-strong form of EMH. However, Odendaal (2014) recommended the use of a bigger sample size such as FTSE 250 or FTSE 350 to improve the quality of the results.

Hawaldar (2016) examined share price responses to annual financial results announcements in 2014 by 30 firms listed on the Bahrain Bourse based on the market model. The behaviour of average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) were examined using a 61-day event window, and the results revealed statistically non-significant AARs based on Runs test, sign test and t-test statistics. T-values on CAARs were statistically significant leading to the conclusion that Bahrain Bourse semi-strong form inefficient. However, the sample size of 30 announcement events raises questions about the generalization of results as well as the power of the tests.

Dsouza and Mallikarjunapa (2016) examined share price responses to quarterly earnings announcement news on the Indian stock market by a sample of 500 announcing companies in March 2011 (BSE-500 index members). Mean Adjusted Model, Market Adjusted Model and Ordinary Least Square Model were used to determine abnormal returns. The results show a failure of BSE to absorb publicly available information, implying that investors in this market can forecast future returns based on new information flows. Syed and Bajwa (2018) also used quarterly earnings announcements made on the Saudi Stock Exchange (Tadawul) to compare the price reactions to bad, good and no news. They used a sample of 115 listed firms over the 2009 to 2014 period (1601 events) and applied the market model (with daily closing prices) as a model of expected return. Their results show significant abnormal returns and post-earnings announcement drift (PEAD) around earnings announcement dates and concluded that the Saudi Stock Market does not bear semi-strong EMH. However, they cautioned on the possible effects of the use of a 250-day estimation window, which might have resulted in overlapped data between announcement events. The contradictory evidence provided by various researchers on the EMH continues to call for further investigations, in particular on earnings announcement effects on stock returns.

2.5.2 Stock Price Response to Public Announcements in African Markets

Most informational efficiency studies conducted in African developing markets focused on weak form efficiency of which most of them revealed weak form inefficiency (Chiwira & Muyambiri, 2012;). Among the few informational

efficiency studies in Africa are Mlonzi et al. (2011), Sare et al. (2013) and Eleke-Aboagye and Opoku (2013).

Mlonzi et al. (2011) used daily return data from 34 annual earnings announcing companies listed on the JSE-AltX over the 1st January to 31st December 2009 period, and the CAPM as a model of normal returns. Estimation and event windows were 1500 and 16 trading days respectively. Findings uncover a substantial negative share price reaction to earnings announcements. However, the 16-day event window did not appear to be able to illustrate when rectification or price recovery would occur.

Sare, Akuoko and Esumanba (2013) used 57 annual earnings announcement events by 19 event firms listed on the Ghana Stock Market (GSM) over the 2009 to 2012 period, the market portfolio index as a proxy for the expected return. The research revealed a change in share prices following earnings announcements and concluded that earnings announcements do convey information to the market which investors react accordingly. Similarly, Eleke-Aboagye and Opoku (2013) analyzed changes in stock prices of 10 event companies on the GSMs over the January 2010 to June 2013 period using the market model with 120 and 21 trading days as estimation and event window respectively. The findings showed share price behaviour around the event to be inconsistent with the semi-strong EMH. Kiremu et al. (2013) used event study methodology to analyze volumes and stock price response to annual earnings announcements at the Nairobi Securities Exchange (NSE). The results showed no abnormal returns around the event date, consistent with the EMH. Other studies on the NSE confirmed the same (Messo & Byaruhanga, 2019; Olang & Akenga, 2017).

2.5.3 Stock Price Response to Public Announcements in Tanzanian Markets

Three studies on record that examined DSE's efficiency include Guney and Komba (2016), Njuguna (2016) and Katabi and Raphael (2018). Despite all three being limited to testing weak form efficiency, they also differ not only in sampling period, tests, indices, pricing interval, and testing techniques but also in their findings. Guney and Komba (2016) for example covered eight years (Jan 2007 to 2014), DSEI, TSI, BI, CS and IA and separated the analysis based on price and return indices, and used Augmented Dickey-Fuller, Variance ratio and ranks and runs tests. Efficiency was confirmed only on the indices of DSEI, BI, and CS, but not on the indices of TSI and IA. Njuguna (2016) covered Nov. 2006 to Aug. 2015 and Jan 2009 to Aug 2015 periods for DSEI and TSI respectively, separately by daily and weekly return. On the other hand, Katabi and Raphael (2018) used daily closing prices over the Jan 2009 to March 2015. Both studies used correlation, unit root, runs test and variance ratio tests. While Njuguna found DSE to be weak form efficient by variance ratio only, none of the tests indicated weak form efficiency in Katabi and Raphael (2018). Thus, there are inconsistencies in the empirical evidence about whether DSE is weak-form efficient. While fewer studies exist on this form of efficiency, there are even scantier studies or none exist on the semi-strong efficiency of DSE. This represents a knowledge gap and calls for the need to generate more evidence, especially from frontier markets.

2.5.4 Determinants of the Stock Price Response

The variability of the average abnormal returns across events may be explained by the characteristics of the companies engaging in the events (Bessembinder et al., 2019). Thus, to get a better insight as to which companies' specific variables influence the stock price response to earnings announcements, the current study used some potential explanatory variables which include, firm age, firm size, the industries in which companies operate and changes in earnings.

2.5.4.1 Firm's Age Since Incorporation.

The age of a company can be described as the period of time since it was established (Kieschnick & Moussawi, 2018). Listed firms vary in the length of time they have been established. Schultz (2004) and Jin (2000) suggested that the firm's age could impact the extent of investors' response. Smith and Watts (1992) found in their research that a company's age could have a negative correlation with its cumulative abnormal returns when examining corporate leverage and dividend policies. Meanwhile, Sare and Esumanba (2013) found a significant positive correlation between company age and cumulative abnormal returns on the Ghana Stock Exchange.

The stock price response to earnings announcements for a reputable company could vary compared to a less well-known company. Investors tend to perceive larger, well-established companies as more reliable compared to smaller, newer companies (Ferri & Jones, 1979; Titman & Wessels, 1988; Rajan & Zingales, 1995). Therefore, this research determined if the age of a firm affects the stock price response in the Tanzanian Stock Market, a frontier market.

2.5.4.2 Firm's Size.

Earnings announcements are usually seen as more informative for smaller companies because they have fewer details disclosed beforehand (Ball, & Shivakumar, 2008; Bamba, 1987), leading to reduced information production outside of their earnings announcement periods (Collins et al., 1987). Therefore, the size of a company is a key factor in determining the way its stock price responds (Chan et al., 2005; Christensen et al., 2004).

The impact of information transfer sizes on announcing and non-announcing companies could vary. For example, some researchers propose a direct relationship between the value of a company and the level of information shared with market participants (Collins et al., 1987) and that stock price movements are more pronounced for smaller firms (Alzahrani, 2010). Contrary to Hatem's (2015) findings, it appears that firm size has a negative impact on abnormal returns. Furthermore, Cressy and Farag (2011) found an inverse relationship between a company's size and cumulative abnormal returns.

Conversely, Chan et al. (2005) discovered that firm size does not have a significant impact on earnings announcements in the three-day event window, suggesting that the market has access to ample information about these firms. Therefore, this research aimed to investigate the impact of a company's size on annual earnings disclosures for firms on the Tanzanian stock market, which operates as a frontier market.

2.5.4.3 The Announcing Firm's Industry.

A company's abnormal return can be viewed as a function of industry and a firm-specific component (Hui & Yeung, 2013) and thus, industry competitors have a higher correlation of earnings within an industry than with companies in other industries (Gregory & Zhu, 2014). Baker et al. (2019) contended that companies operating within the same industry are competitors that are similar in terms of inputs and technology used and the outputs produced. Thus, subsequent earnings announcements by competing companies could convey relevant news about the industry in which the company operates. Kovacs (2016), argued that EMH holds when there is no confirmation of a company's earnings announcement by the subsequent same-industry companies' reports. Additionally, Sare and Esumanba (2013) noted that companies in the manufacturing sector react promptly resulting in substantial positive abnormal returns when compared to companies in different sectors. Thus, it was important to find out whether industries in which the event companies operate in a frontier market, the Tanzanian market, have an impact on the stock price response to earnings announcements. Moreover, firms operating in highly regulated industries are like to have more information available on the market to the extent that when such firms announce earnings, there are no surprises. This study assessed whether cumulative average abnormal returns over the specified event windows around the event day are explained by the announcing firm being in the financial sector relative to being in other sectors such as manufacturing and service.

2.5.4.4 Change in Earnings.

The stock price response to earnings announcements might be different from each publication due to changes in earnings from one period to another. Concerning the preceding observed earnings, the current announced earnings might lead to an increase in earnings (good news) or a decrease in earnings (bad news) (Syed & Bajwa, 2018). Good news tends to enhance the investors' confidence in the certainty about the future course of the company and its returns, and the opposite is true for bad news (Dangol, & Bhandari, 2019). Thus, a positive or negative value effect is expected from an increase or decrease in earnings, respectively. Landsman and Maydew (2002) discovered that stock prices tend to increase after positive earnings surprises and decrease after negative surprises. However, Syed and Bajwa (2018) proposed that negative news samples elicit a stronger market response compared to positive news samples, especially on the day of the announcement. The present study analyzes stock price response to good relative to bad news announcements, to observe whether positive changes in earnings influence stock price response positively.

2.6 Research Gap Identified

The EMH theory in its semi-strong form states that; an asset's prices reflect all publicly available information, and that no one will consistently outperform the market on a risk-adjusted basis as the market prices react only to new information. Based on empirical findings, there is a theoretical gap regarding the semi-strong form of the EMH as some of the evidence proposes the theory to hold (Messo & Byaruhanga, 2019; Odendaal, 2014; Olang & Akenga, 2017) while others oppose it

(Dsouza & Mallikarjunapa, 2016; Hawaldar, 2016; Syed & Bajwa, 2018). These mixed results call for further investigation in the informational efficiency arena. Since very limited literature is available on the informational efficiency of the DSE, this study contributed to the available literature to fill the knowledge gap by adding new empirical findings by testing the informational efficiency of the DSE.

Furthermore, literature on how the estimated ARs are influenced by firm and event-level characteristics is scant, especially in the frontier markets. The present study, firstly, stresses the impact of earnings announcements on stock prices at the DSE, and secondly, provides evidence on which companies' specific variables (industries, size, age and change in earnings) influence the stock price response to earnings announcements. The practical findings of this study are useful to various stakeholders to support their decision-making process.

2.7 Conceptual Framework

From the literature reviewed, a conceptual framework is derived and presented in Figure 2.1. First, the study estimated the size and significance of the abnormal returns around the announcement day (H_1). Subsequently, the study determined whether the firm and event-level variables (age, size, industry, and change in earnings) together explain the variability in the cumulative average abnormal returns (H_2 - H_5), respectively.

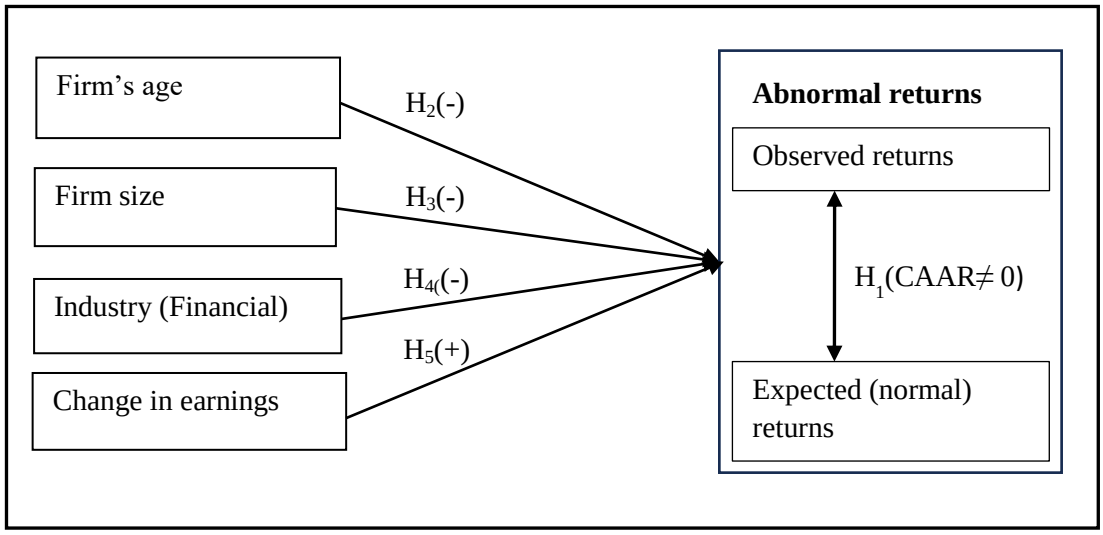

Figure 2.1 Conceptual framework

Therefore, the dependent variable of this study is stock price response measured by Cumulative average abnormal returns, which is the difference between observed returns and normal returns following public announcements of companies' earnings. Explanatory variables of earnings announcing firms which include the firm's age, size of the companies, industries in which companies operate, and change in earnings are variables with a potential for explaining variability of average abnormal returns around earnings announcements.

2.8 Statement of Hypothesis

From the conceptual framework in Figure 2.1, the following hypotheses were tested.

H_1: Cumulative average abnormal return is not equal to zero.

H_2: Firms' age has a negative impact on the level of cumulative average abnormal return.

H_3: Firms' size has a negative impact on the level of cumulative average abnormal

return.

H_4: The industry in which companies operate (financial) influence negatively the level of cumulative average abnormal return.

H_5: A positive change in earnings has a positive influence on the level of cumulative average abnormal return.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 An Overview

This chapter presents the research methodology used to carry out the study. It covers the research philosophy, research approach, methods, strategy as well a research design. I further detail the data collection and analysis method. More specifically it outlines the event study methodology, which has been the as well as the research design and methods popularly used in stock price reaction studies.

3.2 Research Philosophy

Saunders et al. (2023) explained research philosophy as the term relating to the development of knowledge and the nature of that knowledge. This study used the positivism philosophy with a deductive approach to develop a proposition on the reaction of stock price to the information contents from earning announcements.

3.3 Research Approach

A research approach refers to how a study is conducted to investigate a phenomenon and the relevant data is collected. Three main research approaches are available in the literature, namely – deductive, inductive, and abductive research approaches.

This study adopted a deductive research approach which begins with a theoretically backed hypothesis, collects data and analyses it to determine whether the outcome of the analysis will provide sufficient evidence to support those hypotheses (Saunders et al., 2019). The choice of this approach is based on the fact that it is an approach that aligns perfectly with the positivism philosophy. This approach helps ensure that findings are based on observable evidence and can be rigorously tested and validated. The other two approaches are more aligned with the interpretivism and pragmatism research philosophies, respectively.

3.4 Research Method

There are three research methods namely – quantitative, qualitative and mixed-method research. This study adopted the quantitative method. In addition to being associated with the positivist research philosophy, the choice of quantitative research method was also driven by the nature of the data that was used in the study which was collected using predetermined and highly structured techniques (Saunders et al., 2019). The intention of employing the quantitative research method was to assess the causal relationship between the dependent variable (cumulative average abnormal returns) and the independent variables (firm age, firm size, industry of operation, and changes in earnings). All these variables were measured numerically and analysed using a range of statistical and graphical techniques. The quantitative research method is appropriate for stock market studies and event studies because it aligns with the empirical, quantitative nature of the data and the scientific methods used to analyze it.

3.5 Research Design

The study followed two steps. In the first step, the cumulative average abnormal returns (CAARs)were computed and tested against zero, as per the efficient market hypothesis (EMH). In the second step, these CAARs were evaluated statistically to determine whether their variability across the events' sample could be explained bet the four variables of firm age, size, industry and earnings change. Therefore, to accomplish this, the study employed the explanatory research design, which is in line with the already chosen research philosophy, approach and method (Saunder et. al., 2019).

3.6 Research Strategy

The analysis involved tracking share prices around earnings announcement events, i.e., secondary data, which are historical, and therefore, the study adopted an archival research strategy. Saunders and Lewis (2018) define archival research strategy as a strategy that uses administration records and documents (e.g., minutes, media communication, accounts, etc.), published accounts, Board Chair communications, and share price records, as principal sources of data.

3.7 Data Collection

3.7.1 Population

Since the study involved collecting secondary data on the event companies and the market, the population is defined as the full set of cases from which a sample is taken (Saunders et al., 2023). The study's cases were the earning announcement events, the total number of which was determined by the sum of the product of event companies and the number of events per company (Table 3.1).

3.7.2 Sampling Design and Procedures

The entire population of listed companies on the DSE were subjected to inclusion and exclusion criteria. Those with missing data points, either as a result of non-trading or lack of financial and market information, were excluded from the sample (Dsouza & Mallikarjunappa, 2016; Mlonzi et al., 2011; Syed & Bajwa, 2018). Besides, the cross-listed firms were excluded, in an attempt to avoid the influence or side effects of announcements made in their countries of origin and other foreign policies and regulations.

Table 3.1 Population of Events and Sampling

S/No:	Company	Year of Incorporation	Year of Listing	Sampling Period	Total Expected Events	Retrieved Events over the period	Sufficient data	
							Stock price (-90, + 10) days	firm characteristics, DSEI- & TSI-based CAARs
1	CRDB	1996	2009	2007 to 2021	12	12	12	**12**
2	DCB	2002	2008	2007 to 2021	13	7	3	**2**
3	DSE	1996	2016	2007 to 2021	5	5	5	**4**
4	JATU	2016	2020	2007 to 2021	1	1	1	**1**
5	MBP	2011	2013	2007 to 2021	8	6	1	**1**
6	MKCB	2009	2015	2007 to 2021	6	3	0	**0**
7	MCB	2012	2015	2007 to 2021	6	5	1	**1**
8	NICO	2001	2018	2007 to 2021	3	5	3	**3**
9	NMB	1997	2008	2007 to 2021	13	11	5	**5**
10	PAL	1991	2011	2007 to 2021	10	4	0	**0**
11	SWALA	2011	2014	2007 to 2021	7	7	0	**0**

12	SWISS	1984	2003	2007 to 2021	14	12	9	**9**
13	TCCL	1980	2002	2007 to 2021	14	13	8	**8**
14	TCC	1961	2000	2007 to 2021	14	15	11	**9**
15	TPCC	1966	2006	2007 to 2021	14	14	13	**12**
16	TTP	1994	1999	2007 to 2021	14	9	2	**2**
17	TBL	1933	1998	2007 to 2021	14	14	12	**10**
18	TICL	1999	2018	2007 to 2021	3	3	2	**2**
19	TOL	1950	1998	2007 to 2021	14	13	6	**6**
20	VODA	1999	2017	2007 to 2021	4	4	1	**1**
21	YETU	2013	2016	2007 to 2021	5	4	0	**0**
					194	**167**	**95**	**88**

The two DSE indexes, the DSEI and TSI, in local currency, the Tanzanian shilling (TZS), were the source of the daily closing price and market price employed in this study. The DSEI, the main stock market index in Tanzania, was first used and then the TSI for checks and balances. Daily stock prices were believed to provide enough observations for significant statistical studies and to be reflective of the true distribution typical of the frontier market, given the market's size and recentness.

Table 3.1 displays the total number of listed companies involved in the sample selection process. The period covered in this study ranged from 2007 to 2021. The DSE's decision to start compiling electronically and maintaining a computerized database in 2007 determined the commencement time. The choice of finishing time was dictated by the availability of the most recent possible data at the beginning of this study’s data collection exercise.

Based on the year of listing of each company, and the Companies Act which requires each registered company to publish its financial statements at the end of each period for public consumption, the total number of expected annual earnings announcements (EPS) was 194. However, only 167 events were retrieved over the period. The availability of trading data sufficient for the estimation and event windows of either of the indices (i.e. DSEI /TSI) reduced the number of events under consideration to 95. This data was further subjected to an event having sufficient data for meaningful CAAR computation based on DSEI and TSI share prices. Only events with CAAR for both DSEI and TSI were retained. Hence, the final data used for analysis consisted of 88 earnings announcements, issued by 17 listed companies. The data were suitable to determine abnormal returns arising from the announcements with corresponding firm characteristics, market return for both DSEI and TSI as well as AARs and CAARs.

3.8 Event Study Design

The study adopted the standard event study methodology, which is commonly used to examine stock price movements around corporate events (Sorescu, Warren, & Ertekin, 2017). The methodology helps to find the promptness of stock price movement in response to newly released financial information to the capital markets (Syed & Bajwa, 2018). The specific inputs to the event study design include event day, event window, estimation window and a choice of model of expected return.

3.8.1 Event Day

The event day is the date on which earnings information is publicly announced (Su, 2003). These announcement dates were obtained from the DSE database. Daily newspapers were also used as complementary sources. If the announcement was made during the weekend or holiday, then the news of the announcing firm's stock price on the next trading day was used (Su, 2003).

3.8.2 Event Window

There is no consensus regarding the length of the event window. For instance, MacKinlay (1997) and Su (2003) argued that the share price response to earning announcements is mostly reflected over the 21-day event window. Other studies have used event windows which ranged from 3 to 61 trading days symmetrically surrounding the identified event day, e.g., Dsouza and Mallikarjunapa (2016), Hawaldar (2016), Mlonzi et al. (2011), Sare et al. (2013), and Syed and Bajwa (2018). This study adopted the 21 trading days' period (-10, +10) with day 0 as the earning announcement day as suggested by MacKinlay (1997) and Su (2003). The choice of this wide event window is preferred as it captures the possible pre-event reaction which could have started long before the actual announcement, especially in developing stock markets where the information environment is not certain (Eleke-Aboagye & Opoku, 2013; Kumar, 2017; Syed & Bajwa, 2018), and more so in frontier markets.

3.8.3 Estimation Window

Just like with the event window, there is no consensus regarding the number of days for the estimation window (MacKinlay, 1997). The estimation window in this study was set at 80 trading days guided by past studies such as that of Hasan et al. (2012).

3.8.4 Models of Normal (Expected) Returns

A model of expected return is used to estimate what would be the normal returns against which the actual/observed stock returns are compared, the difference being the abnormal returns. Several models exist in the finance literature for estimating expected returns. The estimation methods differ in terms of sophistication and data requirements. The models are presented in the following subsections.

3.8.4.1 Constant Expected Return Model

The constant expected return model is considered to be the simplest model (Brown & Warner, 1985). It uses the mean return of an asset *(k)* over the estimation window, as an estimate of the expected/normal returns of that asset over the event window.

$$E(R_i) = k \quad (1)$$

The model assumes that an asset's return over time is independent and identically normally distributed with a constant mean and variance; i.e., time-invariant. Despite its simplicity, the model provides important intuition about the statistical behaviour of asset returns and prices and serves as a benchmark against which more complicated models can be compared and evaluated.

3.8.4.2 Capital Asset Pricing Model

A more sophisticated model for estimating expected asset returns is the capital asset pricing model (CAPM). It predicts the expected returns based on risk and risk premium of an asset, in a particular stock. The goal is to evaluate whether a stock is fairly priced by comparing its risk and the time value of money to its expected return (Elton et al., 2014).

$$E(R_i) = Rf + \beta_i(E(R_m) - Rf\ ) \quad (2)$$

Where, $E(R_i)$= Expected or normal return on stock *i*; Rf= Risk-free rate of interest; $E(R_m)$= Expected return on the appropriate stock market; β_i = the relevant risk measure (an index of systematic risk) which is given by:

$$\beta_i = \frac{\rho_{i,m}\sigma_i\sigma_m}{\sigma_m^2}$$

Where, $\rho_{i,m}\sigma_i\sigma_m$ Is the covariance of $R_i$with R_m over the estimation period, and σ_m^2 is the variance of R_m over that period.

Under the CAPM, markets are assumed to be highly efficient with the non-existence of transaction fees, taxes, inflation, or short-selling restrictions and, all investors hold homogeneous expectations about the mean return and variance of assets. It also assumes that the same efficient frontier is available to all investors (Elton et al., 2014).

3.8.4.3 Market-adjusted Return Model

The market-adjusted return model assumes that *ex-ante* expected returns are the same for all securities and therefore equal, in any period, to the expected market return (Brown & Warner, 1985). The model considers the market-wide movements, which

occurred at the same time that the sample security experienced the event (Yang & He, 2019). Since the market portfolio of risky assets is a linear combination of all securities, it follows that for any security *i*:

$$E(R_{it}) = E(R_{mt}) = R_{mt} \quad (3)$$

where, $E(R_{it})$= Expected return on stock *i* at time *t*; $E(R_{mt})$= Expected return on the appropriate stock market at time *t*; R_{mt}= Market return at time *t*.

3.8.4.4 Market Model

The market model, a one-factor OLS regression equation, is given as:

$$E(R_{it}) = \alpha_i + \beta_i R_{m,t} + \varepsilon_{it} \quad (4)$$

Where, $E(R_{it})$=Return on stock *i* at time period *t*; R_{mt} = Market return at time *t*; ε_{it} = Error term; α_i And β_i = Regression coefficients

In application, Model (4) is used to generate parameters α and β over the estimation window. Then these regression parameters are used to estimate expected returns over the event window. The errors in the model are assumed not to correlate with market returns and its expected value is zero. In addition, the firm-specific events are not correlated across the assets. Although the 'market model' is widely accepted as the standard model, there are also some criticisms. For instance, the model assumes that the risk-free interest rate included in the α_i factor is constant, which conflicts with the presumption that market returns vary over time (Corrado, 2011).

3.8.4.5 Matched Firm Return Model

The matched firm return model uses the performance of comparable firms' returns as a benchmark (proxy) of its expected returns. The selection of the benchmark is important. It is advised to conduct robustness checks using samples matched on several characteristics such as size, size and industry, market-to-book ratio, rate of capital expenditure, recent returns, and firm profitability (Bessembinder et al., 2019). The model is given as:

$$E(R_{it}) = R_{jt} \quad (5)$$

Where, the return of company *i* is matched to that of company *j* at time *t* by the selected relevant characteristics.

3.8.5 Comparison and Choice of Model of Normal Return for the Study

This study used the market model since it is the most popular and predominant model in practice as a model for expected return calculation in event studies (McKinley, 1997; Corrado, 2011). The difference between the market model and the CAPM is that the CAPM imposes an additional restriction (namely: the intercept equals the risk-free rate). Because of this additional restriction, the variance of the error term will be larger than in the market model. Now, because the variance of the error terms from the estimation window is used to construct the test statistics, a larger error variance translates into a less powerful test, making CAPM less preferred in favour of the market model (MacKinlay, 1997). Against the constant expected returns model and other statistical models, MacKinlay further argued that; the market model is superior due to its ability to reduce abnormal returns variations. Moreover, Holler (2014) reviewed a sample of 400 event studies and found that 79.1% of them

used the market model, 13.3% the market-adjusted return model, 3.3% the constant mean return model, 3.6% multi-factor models, and only 0.7% the CAPM model. Therefore, the present study followed suit by using the market model.

3.9 Variables and Measurement Procedures.

Several variables were used in the study. These are detailed in Sections 3.9.1 – 3.9.3.

3.9.1 Event Study Framework.

The study used the standard event study framework. The components of this framework as well as their sources are summarized in Table 3.2. They include the earnings announcement day, model of expected return, event window and estimations window.

Table 3.2 The Event Study Framework

Variable	Measure	Source
Earnings announcement day	The date on which the company declares financial performance	Eleke-Aboagye and Opuku (2013)
Expected return	Market model	MacKinlay (1997)
Event window	21 trading days (-10 to +10)	MacKinlay (1997), Su (2003)
Estimation window	80 trading days preceding the event window	Hasan et al. (2012).

3.9.2 Price Response Variables

Table 3.3 summarizes the key return variables used in the study and describes how each was computed. Their model's specifications are given in Equations 8 – 10 in Section 3.11.3.

3.9.3 Explanatory Variables

The study used four explanatory variables of firm size, firm age, industry/sector and change in earnings in a given announcement to explain the variability in the cumulative average abnormal returns over the event window. Table 3.4 summarizes these variables and describes how each was measured in the study.

Table 3.3 Return Metrics and Their Computations

Variable	Measure	Source
Abnormal return	Difference between observed and expected return	Computation based on the standard event studies procedure
Average abnormal return	The sum of abnormal returns across events divided by the number of events	
Cumulative average abnormal returns	Cumulative summation of the average abnormal returns over the event window	

Table 3.4 Explanatory Variables

Variable	Measure	Source
Firm age	No of years since incorporation	Kieschnick & Moussawi (2018).
Firm size	Ln(Total Assets)	Dang et al. (2018).
Industry (Financial)	Financials = 1, 0 otherwise	Baker, Ni, Saadi, and Zhu (2019)
Change in earnings	Δ Earnings >0, = 1, 0 otherwise	Ball and Brown (1968)

3.10 Methods of Data Collection

An archival research strategy was used to collect data. Both daily closing share and market prices were collected from DSE. Equally, financial statements were collected from the DSE website and individual company's websites. From these financial statements, announcement dates, firm size, firm age, earnings per share values and the industry in which companies operate were deduced. Daily newspapers were also used as supplementary sources for announcement date data.

3.11 Return Computation

3.11.1 Daily Returns

For each listed company, the daily returns were calculated from the price data as follows:

$$R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad (6)$$

Where R_{it} = the return on stock i at time t, P_t = the price of stock i at time t and P_{t-1} = the price of stock i at time $t - 1$. A similar approach was applied in the computation of market return (R_{mt}).

$$R_{mt} = \frac{P_{mt} - P_{mt-1}}{P_{mt-1}} \quad (7)$$

Where R_{mt} = the market return at time t, P_{mt} = the market price at time t and P_{mt-1} = the market price at time $t - 1$. The market returns were computed for both the DSEI and the TSI.

3.11.2 Parameter Estimates – α and β

For each event, parameters α and β were estimated using the market model (Equation 4) over the 80 trading days preceding the event window. Again, the parameter estimates were computed for both the DSEI and the TSI.

3.11.3 Abnormal Returns

For each day in the event window, the abnormal returns were computed as the difference between the realized (observed) returns and the expected returns on the same day as:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (8)$$

Where, AR_{it} = Abnormal return for stock i on day t; R_{it} = observed return on stock i on day t; R_{mt} = observed return on market index m on day t; α_i and β_i are the parameters estimated in equation (4). Next, the *ARs* were averaged across the number of observations (events) (N) for each day *(t)* of the event window as:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad (9)$$

Then, the cumulative average abnormal returns $CAAR$ for the 21-day event window T_1 (day t-10) to T_2 (day t+10) for each event were obtained by summing $AARs$. The model over the window (T_1, T_2) is expressed as:

$$CAAR(T_{1,}T_2) = \sum_{i=T_1}^{T_2} AAR_{it} \quad (10)$$

The average and cumulative average abnormal returns were estimated for both the DSEI and the TSI.

3.11.4 Testing for Semi-strong Form of EMH

The EMH is embodied in the statement that the current price of an asset is the best estimate of its fundamental value. That is, asset prices reflect the optimal use of publicly available information. Thus, the null hypothesis is that the mean average abnormal return in the period surrounding the event day is zero. That is;

$$H_0: AAR = 0$$

$$\text{H}1: AAR \neq 0$$

Where; AAR =Abnormal Returns

To test for market response to the earnings announcements, the *AARs* are tested for statistical significance using the t-statistic. The model is given as:

$$tAAR = \frac{AAR_t}{SD(AAR_t)} \tag{11}$$

Where, $tAAR =$ t-statistics of average abnormal return; $SD(AAR_t)$ = standard deviation of AAR_t calculated over the estimation window (from day -90 to day -11). Rejecting the null hypothesis $H_0: AAR = 0$, in favour of the alternative $H_1: AAR \neq 0$ means that stock prices inefficiently reflect publicly available information contained in earnings announcements, leaving a room for statistically significant abnormal returns to be generated from trading on the information contained in earnings disclosures. In addition, the $CAARs$ were tested statistically as:

$$tCAAR = \frac{CAAR_t}{SD(CAAR_t)} \tag{12}$$

Where, $SD(CAAR_t)$ = Standard deviation of $CAAR_t$ calculated over the (T_1, T_2) event window.

The t-statistics for AAR and CAAR were calculated separately for DSEI and TSI.

3.11.5 Explanatory Variability Model

The variability of cumulative average abnormal returns is explained by selected firms' characteristics; i.e., firm age, firm size, industry and change in earnings, using the following multiple regression analysis (MRA) model:

$$CAAR_{(T_1,T_2)} = \propto + \beta_1 Firm\ age + \beta_2 Firm\ size + \beta_3 Financial + \beta_4 \Delta Earnings + \varepsilon_i \quad (13)$$

Where, $CAAR_{(T_1,T_2)}$= Cumulative average abnormal return over (T_1,T_2) window; $\propto$ and β = regression parameters and ε_i= error term. The model (Equation 13) was run separately from DSEI and TSI. In addition to the standard regression, stepwise (statistical) regression was run to determine the factors that had a significant effect on the CAARs.

3.12 Checking for the Regression Assumptions

Prior to running the MRA model, preliminary analysis of the data was performed to ensure that the data conformed with the model's underlying assumptions, of no outliers, sampling adequacy, normality, linearity, homoscedasticity and multi-collinearity (Field, 2018; Pallant, 2020; Tabachnick & Fidell, 2018). Following the detection of non-normality and heteroscedasticity problems in the data, the analysis was complemented by a wild bootstrapping regression estimation as a way of assessing the robustness of the regression estimates.

3.13 Expected Results

The researcher expected to find significant abnormal returns around earnings announcements which would imply that the DSE is inefficient in the semi-strong sense. Furthermore, the study expected to find firm age and size as well as industry (i.e., operating in the financial sector) to have a negative effect on the CAARs while a positive change in earnings was expected to have a positive effect on CAARs.

3.14 Ethical Consideration

Ethical practices are expected throughout the research process, from the designing and planning to seeking access to organizations, individuals or existing research data. It also covers the processes of collecting, analyzing and reporting the results. Accordingly, Saunders et al. (2029 define ethics as the standards of behaviour that guide your conduct in relation to the rights of those who become the subject of your work or are affected by it. This study utilized secondary data – stock and market data as well as data obtained from both the stock market and the firm's websites (such as financial statements). Extraction of the data and its subsequent processing was done following all the principles of anonymity and confidentiality. Before that research clearance was sought from the University (Appendix 7) with which a request was sent to DSE and the firms and received positive responses. Data analysis was done using standard procedures as specified in the event study methodology. The results were reported in a way that preserved the anonymity and confidentiality of the firms involved in the study.

CHAPTER FOUR

FINDINGS

4.1 An Overview

This chapter presents the findings of the study which was to examine stock price responses to earnings information made available to the market by companies listed on the DSE, following the methodology outlined in Chapter 3. The data consisted of 88 earnings announcements, issued by 17 listed companies (Table 3.1). An event window of 21 trading days around the event day was used to determine any abnormal returns arising from the announcements. Four firm-specific variables were used in a multiple linear regression analysis to explain (predict) the variability in the cumulative average abnormal returns over the event window. The remainder of this chapter is structured as follows: Section 4.2 presents descriptive statistics while hypotheses testing results are presented in Section 4.3. Section 4.4 identifies predictors of abnormal returns followed by regression analysis in Section 4.5.

4.2 Descriptive Statistics

The sample used in the study is 88 announcement events made by 17 companies listed on the DSE for which relevant and sufficient data to estimate the parameters of abnormal returns were available. The event study methodology was applied to estimate the abnormal returns around the event days. To achieve these the observed returns were compared to the market returns. The daily stock prices of the two

selected indices were systematically converted into daily returns. The referred indices are (i) the Dar es Salaam Stock Exchange Index (DSEI) and (ii) the Tanzania Share Index (TSI). The market model was employed to determine abnormal returns. The breakdown of descriptive statistics showing minimum, maximum, mean, standard deviation, skewness and kurtosis values are presented as follows: Table 4.1 provides descriptive statistics of the AAR under DSEI for the sample of earnings announcements in different event windows (pre-event, event day and post-event), while Table 4.2 presents the same for TSI. Tables 4.3 and 4.4 provide descriptive statistics of the CAARs for DSEI and TSI, respectively.

Table 4.1 presents AARs' descriptive statistics of the DSEI for the selected windows, in particular, minimum (Min) and maximum (Max) returns; mean and standard deviation (SD) of the returns; skewness and kurtosis values with related numbers of events (N) for the period under research. The results show that the mean AARs over the 10-day window before the announcements were made (-10, -1) is 0.030% while it displays a -0.004% on the announcement day. The results suggest that AARs vary -across the event window of earnings announcements. The AARs on pre and event days are negatively skewed except for the window (-5, -1) while are positively skewed on post-event days.

Table 4.1 Descriptive Statistics -AAR DSEI

Window	N	Min.	Max.	Mean	S.D.	Skewness		Kurtosis	
						Statistics	Std.	Statistics	Std.

							Err.		Err.
AAR(-10, -1)	88	-.06422	.02644	.0003037	.0084081 2	-4.953	.257	41.071	.508
AAR(-5,-1)	88	-.01154	.04371	.0014095	.0057908 5	4.683	.257	32.979	.508
AAR(-2, -1)	88	-.08871	.03685	.0006328	.0115224 7	-5.112	.257	42.906	.508
AAR(0)	88	-.10456	.07947	-.0000366	.0195116 9	-.996	.257	13.550	.508
AAR(+1, +2)	88	-.02699	.07947	.0025661	.0113935 9	3.922	.257	24.918	.508
AAR(+1, +5)	88	-.01968	.04862	.0027809	.0080142 0	2.451	.257	12.643	.508
AAR(+1, +10)	88	-.00938	.02898	.0019652	.0050294 4	2.281	.257	9.974	.508
AAR(-2, +2)	88	-.02722	.06242	.0012722	.0084581 6	3.840	.257	32.947	.508
AAR(-5, +5)	88	-.00816	.04920	.0019014	.0061871 1	5.304	.257	39.438	.508
AAR(-10, +10)	88	-.02357	.03017	.0010787	.0050551 8	.848	.257	17.909	.508

Notes: *AAR* = Average abnormal return in the specified (T_1, T_2) event window, DSEI = All Share Index

Table 4.2 Descriptive Statistics – AAR TSI

Window	N	Min.	Max.	Mean	S.D.	Skewness		Kurtosis	
						Statistics	Std. Err.	Statistics	Std. Err.
AAR(-10, -1)	88	-.04158	.02047	.0000948	.0062268 4	-3.453	.257	24.367	.508
AAR(-5,-1)	88	-.01378	.04277	.0008777	.0054201 7	5.064	.257	41.938	.508
AAR(-2, -1)	88	-.11021	.03417	-.0002985	.0134804 6	-6.279	.257	52.189	.508
AAR(0)	88	-.06003	.07372	.0003189	.0151141 8	1.075	.257	11.923	.508
AAR(+1, +2)	88	-.02503	.07563	.0025344	.0110456 7	3.699	.257	23.038	.508
AAR(+1, +5)	88	-.01916	.04206	.0028745	.0075606 2	1.998	.257	8.819	.508
AAR(+1, +10)	88	-.00453	.02382	.0021725	.0044111 3	2.310	.257	7.611	.508

AAR(-2, +2)	88	-.03585	.05866	.0009581	.00848448	2.616	.257	28.297	.508
AAR(-5, +5)	88	-.01617	.04526	.0017345	.00598381	4.305	.257	32.699	.508
AAR(-10, +10)	88	-.01281	.02460	.0010949	.00405882	1.610	.257	13.989	.508

Notes: *AAR* = Average abnormal return in the specified (T_1, T_2) event window, TSI = Tanzania Share Index

Table 4.2 presents AARs' descriptive statistics of the TSI for the selected windows, similar to that of DSEI. The table shows that the mean AARs over the 10-day window before the announcements were made (-10, -1) is 0.009% while it displays a 0.217% on the announcement day. The results suggest that AARs vary across the event window of earnings announcements.

Except for windows (-5, -1), the AARs from the pre-event days exhibited a negative skewness. However, the event day and the post-event day recorded positive skewness for all of the parameters. Likewise, the kurtosis values have very high positive values indicating that the returns are highly peaked from the mean. These results are consistent with those of DSEI, i.e. the data sets are not normally distributed.

Table 4.3 presents CAARs' descriptive statistics of the DSEI, which includes the differences in mean values of each of the selected event windows over the 21 days surrounding the announcement days. The mean value of the CAARs ranged from 0.304% to 1.965% for the (-10, -1) and (+1, +10) event windows, respectively. Seeing the standard deviation, CAARs appear to vary considerably. For instance, for the windows (-10, -1), (-5, -1) (+1, +5), (+1, +10), (-5, +5) and (-10, +10), the differences between minimum and maximum values stood at 0.91, 0.28, 0.34, 0.38, 0.63 and 1.13 respectively.

Table 4.3 Descriptive Statistics CAAR DSEI

Window	N	Min.	Max.	Mean	S.D.	Skewness		Kurtosis	
						Statistics	Std. Err.	Statistics	Std. Err.
CAAR(-10, -1)	88	-.64220	.26436	.0030372	.08408122	-4.953	.257	41.071	.508
CAAR(-5,-1)	88	-.05770	.21857	.0070476	.02895425	4.683	.257	32.979	.508
CAAR(-2, -1)	88	-.17742	.07370	.0012655	.02304495	-5.112	.257	42.906	.508
CAAR(0	8	-	.0794	-	.019511	-.996	.25	13.550	.50

)	8	.10456	7	.0000366	69		7		8
CAAR(+1, +2)	8	-.05398	.15894	.0051322	.02278717	3.922	.257	24.918	.508
CAAR(+1, +5)	8	-.09841	.24311	.0139047	.04007099	2.451	.257	12.643	.508
CAAR(+1, +10)	8	-.09380	.28984	.0196520	.05029436	2.281	.257	9.974	.508
CAAR(-2, +2)	8	-.13611	.31211	.0063611	.04229081	3.840	.257	32.947	.508
CAAR(-5, +5)	8	-.08971	.54115	.0209157	.06805819	5.304	.257	39.438	.508
CAAR(-10, +10)	8	-.49496	.63367	.0226525	.10615876	.848	.257	17.909	.508

Notes: *CAAR* = Average abnormal return in the specified (T_1, T_2) event window, DSEI = All Share Index

The distributions of the CAARs of the DSEI over 10 and 2 days before the announcements' days depict negative skewness (-4.95 and -5.11 respectively). However, the distributions of the CAARs following the announcements in all

selected windows were positively skewed. In addition, the CAARs observed for the selected event windows around earnings announcements are not normally distributed as the skewness stood far from zero.

Table 4.4 presents CAARs' descriptive statistics of the TSI for the selected windows, similar to that of DSEI. The mean value of CAARs stood at 0.095% and 2.173% over the range of a 10-day window before and after the event day respectively. The mean values in each of the selected event windows over the 21 days around the event days, portray significant variations.

Table 4.4 Descriptive Statistics – CAAR TSI

Window	N	Min.	Max.	Mean	S.D.	Skewness Statistics	Std. Err.	Kurtosis Statistics	Std. Err.
CAAR(-10, -1)	88	-.41582	.20470	.0009477	.06226843	-3.453	.257	24.367	.508
CAAR(-5,-1)	88	-.06890	.21384	.0043886	.02710086	5.064	.257	41.938	.508
CAAR(-2, -1)	88	-.2204	.0683	-.000597	.02696092	-6.279	.257	52.189	.508

		3		0					
CAAR(0)	88	-.06003	.07372	.0003189	.01511418	1.075	.257	11.923	.508
CAAR(+1, +2)	88	-.05006	.15126	.0050688	.02209135	3.699	.257	23.038	.508
CAAR(+1, +5)	88	-.09578	.21028	.0143725	.03780312	1.998	.257	8.819	.508
CAAR(+1, +10)	88	-.04526	.23824	.0217253	.04411126	2.310	.257	7.611	.508
CAAR(-2, +2)	88	-.17924	.29331	.0047906	.04242238	2.616	.257	28.297	.508
CAAR(-5, +5)	88	-.17791	.49785	.0190800	.06582195	4.305	.257	32.699	.508
CAAR(-10, +10)	88	-.26906	.51666	.0229919	.08523531	1.610	.257	13.989	.508

Notes: *CAAR* = Average abnormal return in the specified (T_1, T_2) event window, TSI = Tanzania Share Index

The distribution of CAARs before and on announcement days is negatively skewed, except on the 5 days before the window, while are positively skewed in post-earnings announcement windows. Furthermore, the skewness of the CAARs observed in the

selected event windows around earnings announcements display a comparable pattern to that of DSEI, that is, not close to zero.

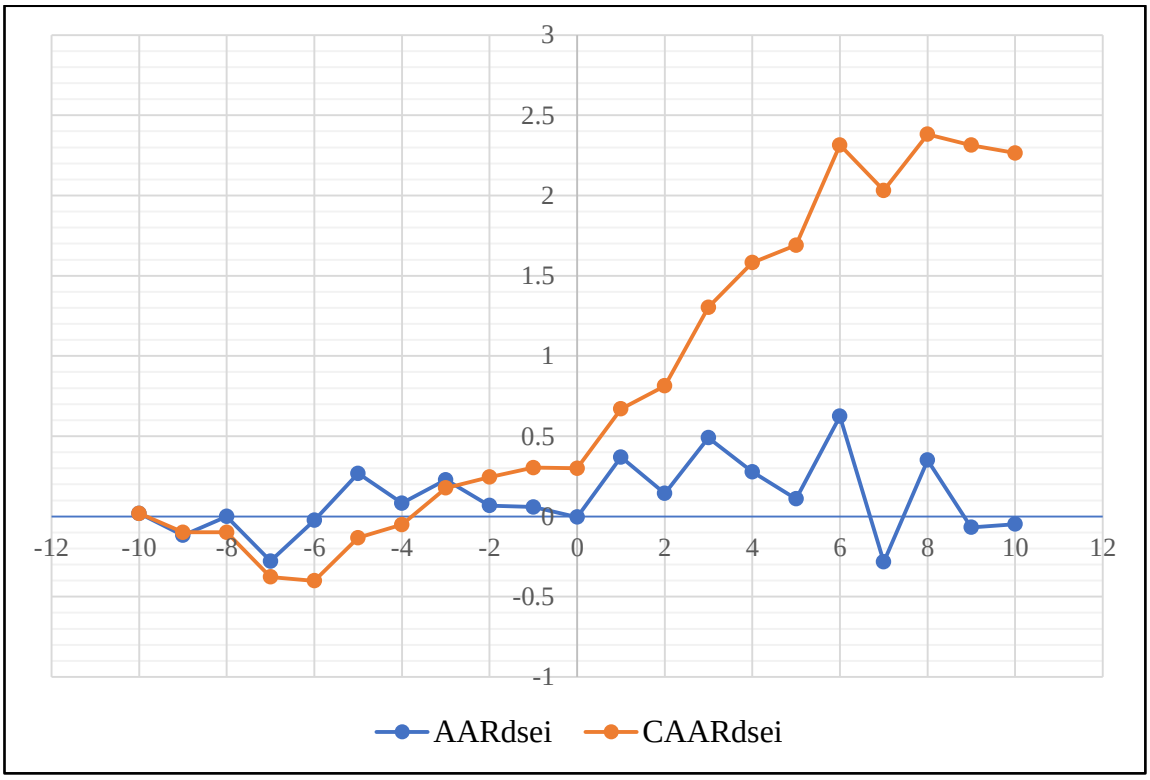

Figure 4.1 AARs and CAARs during the 21-day event window around annual earnings announcements for DSEI

Figure 4.2 graphically presents the AARs and CAARs for earnings announcements for DSE. It summarises the results reported in Tables 4.1 and 4.3. The AARs of the firms during the pre- and post-announcement periods present a common trend. The CAARs decreased from day 10 to day 6 before announcements were made, then the trend started to increase and maintained this pattern until day 6 following the announcements. From this day, the CAARs started to move downwards and then push upwards and reach their maximum level on day 8 after the event. The AARs show an up-and-down fluctuation where the maximum increased level is registered

on day 6 after announcements were made, while the maximum decreased level is recorded on day 7 before and day 7 after the announcement day, with zero increase on event day. The findings confirm that the DSE is not a semi-strong form of the EMH as far as earnings announcements over the period for the stock sample are considered. If the market was efficient in the semi-strong, investors would have responded immediately on the day of the event, with no underreaction or overreaction.

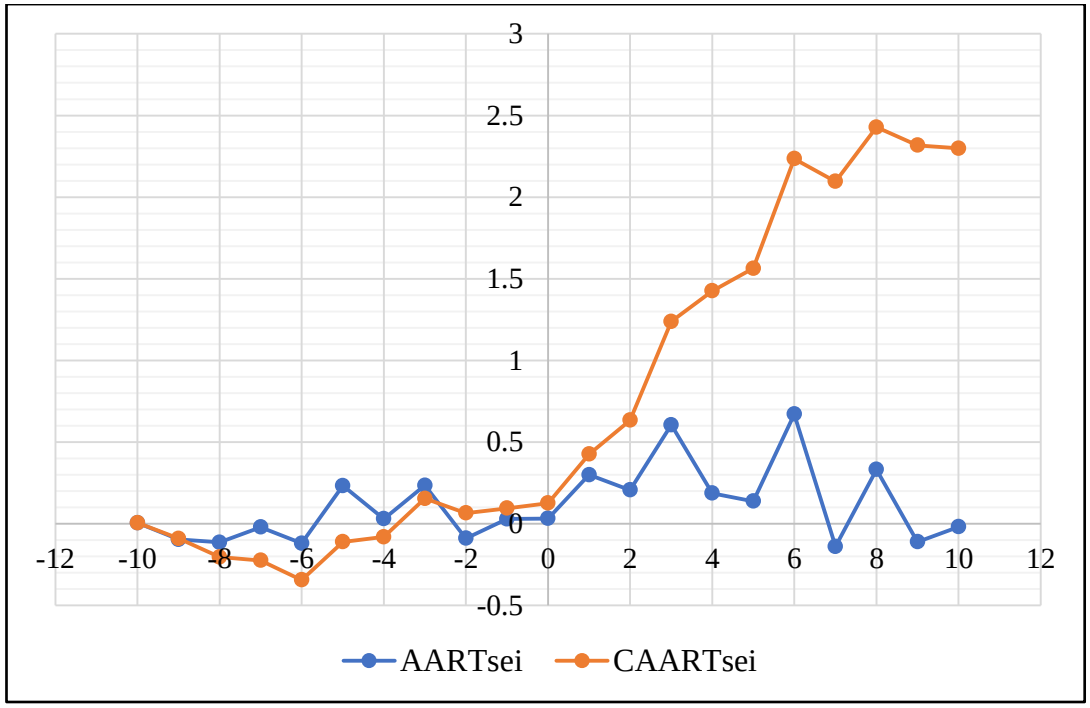

Figure 4.2 AARs and CAARs during the 21-day event window around annual earnings announcements for TSI

Figure 4.3 graphically embodies the AARs and CAARs for earnings announcements for TSI. It is a summary of the results described in Tables 4.2 and 4.4. In general observation, the results in Figure 4.2 are comparable to those shown in Figure 4.1, which means that the AARs and CAARs for earning announcements for TSI are

similar to those of DSEI. The CAARs decreased from day 10 to day 6 before announcements were made up, then it started to increase and maintained this pattern until day 6 following the announcements. From this day, the CAARs started to move downwards and then push upwards and reach their maximum level on day 8 after the event. The AARs show an up-and-down fluctuation where the maximum increased level is registered on day 6 after announcements were made, while the maximum decreased level is recorded on day 7 after the announcement day, with a thin increase on event day. Again, the findings are similar to those of the DSEI, indicating that TSI is also not efficient in the semi-strong form.

4.3 Hypotheses Testing: Average and Cumulative Average Abnormal Returns

The null hypothesis has been expressed as "the mean abnormal return in the period surrounding the event day is zero" which is in line with EMH, that stocks always trade at their fair value, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. The alternative (research hypothesis) was, therefore, $CAAR_t \neq 0$, suggesting that the stock market was semi-strong inefficient. The stock price responses to earnings announcements from the sample of 88 earnings announcements were investigated within the 21-event window.

The results of the tests for the information contained in annual earnings announcements according to the methodologies outlined in Chapter 3 are evaluated and shown in Tables 4.5 and 4.6, presenting figures to only two decimal places

except for figures of DSEI - ARRs in -8 and 0 days whereby two decimal numbers might have provided a less meaningful result. The table presents the average abnormal returns (AARs), the cumulative average abnormal returns (CAARs) and their relative t-statistics.

The first column of each Table presents 21 days of the event window, i.e. 10 days before and 10 days after the announcement is made, where 0 is the event day. AAR is the mean deviation of observed returns from expected returns. The significance of the AARs was tested using a t-test. (Equation 11). The CAAR presents the sum of the AARs in each day from -10 to +10. And these were tested using the t-test (Equation 12). The symbols *, **, ***and ****denote a significant difference from zero at the 10%, 5%, 1%, and 0.1% levels, respectively.

4.3.1 Average Abnormal Return

Table 4.5 shows the AARs and CAARs of each day around annual earnings announcements with relative results of the significance test of abnormal returns for the DSEI and TSI. The findings displayed that there were no significant abnormal returns for the pre-event days and event day.

Based on AAR t-statistics of the DSEI, significant abnormal returns occurred on post-event days, in particular, days +1, +3, +6 and +8 at the levels of 10%, 5%, 0.1% and 10% respectively. Similar results occurred for the TSI, where ARR t-statistics exhibit significant abnormal returns on days +3, +6 and +8 at the levels of 0.1%, 0.1% and 10% respectively. Likewise, abnormal returns significantly occurred after

the announcements, specifically, on +3 day through +10 day in terms of the CAAR t-statistics, for both DSEI and TSI.

4.3.2 Cumulative Average Abnormal Returns

Table 4.6 presents the CAARs and t-statistics for the selected windows around the event window. Different CAAR windows were intended to examine whether the abnormal returns realised in the pre- and post-announcement periods were significant. The observed results reveal no significant price adjustments before the event day for both indices. This possibly indicates that there were no information leaks to the market before the earnings announcement. On the other hand, the post-announcement period is observed with CAARs of (+1, +2), (+1, +5) and (+1, +10) days, exhibiting a sluggish market reaction as both indices documented significant reactions at a level of 10%, 0.1%, and 0.1%, respectively.

Table 4.5 Average and cumulative average abnormal returns for DSEI and TSI

	DSEI				TSI			
Day	AAR (%)	t_{AAR}	CAAR (%)	t_{CAAl}	AAR (%)	t_{AAR}	CAAR (%)	t_{CAAl}
-10	0.02	0.10	0.02	0.10	0.01	0.03	0.01	0.03
-9	-0.12	-0.61	-0.10	-0.36	-0.10	-0.52	-0.09	-0.35
-8	0.0001	0.00	-0.10	-0.29	-0.11	-0.62	-0.20	-0.64
-7	-0.28	-1.44	-0.38	-0.98	-0.02	-0.11	-0.22	-0.61
-6	-0.02	-	-0.40	-	-0.12	-	-0.34	-

		0.13			0.93			0.65			0.84	
-5	0.27	1.39		-0.13	-0.28		0.23	1.27		-0.11	-0.25	
-4	0.08	0.43		-0.05	0.10		0.03	0.17		-0.08	0.17	
-3	0.23	1.18		0.18	0.32		0.23	1.28		0.15	0.30	
-2	0.07	0.35		0.25	0.42		-0.09	-0.49		0.07	0.12	
-1	0.06	0.30		0.30	0.50		0.03	0.16		0.09	0.16	
0	-0.004	-0.02		0.30	-0.47		0.03	0.17		0.13	0.21	
1	0.37	1.92	*	0.67	1.00		0.30	1.63		0.43	0.67	
2	0.14	0.74		0.81	1.17		0.21	1.13		0.63	0.96	
3	0.49	2.54	**	1.30	1.81	*	0.61	3.29	**	1.24	1.80	*
4	0.28	1.44		1.58	2.12	**	0.19	1.02		1.43	2.00	**
5	0.11	0.57		1.69	2.19	***	0.14	0.75		1.56	2.13	***
6	0.62	3.24	**	2.31	2.91	**	0.67	3.65	**	2.23	2.95	**
7	-0.28	-1.47		2.03	2.48	**	-0.14	-0.75		2.10	2.69	**
8	0.35	1.82	*	2.38	2.83	***	0.33	1.81	*	2.43	3.03	***
9	-0.07	0.35		2.31	2.68	**	-0.11	-0.60		2.32	2.82	**
10	-0.05	0.25		2.27	2.56	**	-0.02	-0.10		2.30	2.73	**

$* p < .10$; $** p < 0.05$; $*** p < 0.01$; $**** p < 0.001$

Notes: DSEI = All Share Index; TSI = Tanzania Share Index; AAR and CAAR and Average and cumulative average abnormal returns, respectively on day t in the event window (T_1, T_2); t_{AAR} and t_{CAAR} are t-statistics for AAR and CAAR respectively.

Finally, the effect of stock return response to earnings announcements was assessed by examining the CAARs within the selected window period of (-2, +2), (-5, +5) and (-10, +10). While the 5-day window CAAR was non-significant, the 11- and 21-day window CAARs were positive and statistically significant at 0.1% and 5% levels for DSEI, but at 0.1% and 1% levels for TSI. This indicates that the overall effect of earnings announcements on stock returns is positive and significant, irrespective of whether DSEI or TSI is used to determine the cumulative average abnormal returns. Overall, therefore, based on both AAR and CAAR, and also both DSEI and TSI, the study found evidence in support of the first hypothesis (H1) which stated that AAR as well as CAAR are not zero. This evidence, therefore, suggests that the Tanzania Stock Exchange is not semi-strong efficient.

Table 4.6 Cumulative Average Abnormal Returns Over Event Windows

	DSEI			TSI		
	CAAR (%)	t_{CAAR}		CAAR (%)	t_{CAAR}	
(-10, -1)	0.30	0.50		0.09	0.16	
(-5, -1)	0.70	1.63		0.44	1.07	
(-2, -1)	0.13	0.46		-0.06	-0.23	
0	-0.004	-0.02		0.03	0.17	
(1, 2)	0.51	1.88	*	0.51	1.95	*
(1, 5)	1.39	3.22	****	1.44	3.49	****
(1, 10)	1.97	3.22	****	2.17	3.73	****
(-2, +2)	0.64	1.47		0.48	1.16	
(-5, +5)	2.09	3.27	****	1.91	3.13	****
(-10, +10)	2.27	2.56	**	2.30	2.73	***

$* p < .10$; $** p < 0.05$; $*** p < 0.01$; $**** p < 0.001$

Notes: DSEI = All Share Index; TSI = Tanzania Share Index; AAR and CAAR and Average and cumulative average abnormal returns, respectively in the event window (T_1, T_2); t_{AAR} and t_{CAAR} are t-statistics for AAR and CAAR, respectively.

4.4 Correlation Analysis

Before the remaining four hypotheses of the study (H2 – H5) were tested, Pearson's correlation coefficient analysis was performed to simultaneously assess the linearity (correlation between CAARs and explanatory variables) and no multicollinearity (correlation between pairs of the explanatory variables) assumptions.

Table 4.7 indicates how the cumulative abnormal returns (CAARs) over the different event windows based on the DSEI are related to company characteristics, event characteristics and the industries in which companies operate; in particular, the firm's age, firm size, financial industry, and change in earnings. The results show that the cumulative average abnormal returns over the 2-day window, i.e. $CAAR_{(-10,+10)}$, is significantly negatively correlated with firm age ($r = -.22, p < .05$) and firm size ($r = -.27, p < .05$). However, its relationship with the firm being in the financial sector and having made a positive change in earning in the announcement were respectively negative ($r = -.09, p > 05$) and positive ($r = .13, p > .05$) but statistically non-significant.

Moreover, the results show that the cumulative average abnormal returns over the 11-day window, i.e. $CAAR_{(-5,+5)}$, is only significantly negatively correlated with the firm's size ($r = -.25, p < .05$), not with the firm's age ($r = -.20, p > .05$), or with the firm being operating in the financial sector ($r = -.12, p > .05$). The relationship was also positive with the firm having reported a positive change in earnings in the announcement but this relationship was statistically non-significant ($r = .13, p > .05$).

Finally, results show that the cumulative average abnormal returns over the 5-day window, i.e. $CAAR_{(-2,+2)}$, are only significantly negatively correlated with the firm's age ($r = -.25, p < .05$), not with the firm's size ($r = -.20, p > .05$), or with the firm being operating in the financial sector ($r = -.06, p > .05$). The relationship was also positive with the firm having reported a positive change in earnings in the announcement but this relationship was statistically non-significant ($r = .08, p > .05$). These findings suggest some linear relationship between the cumulative average abnormal returns and firm age and firm size.

Table 4.7 also shows correlations between pairs of explanatory variables. Following Cohen's (1988) cut-off points, firm age and firm size were respectively highly negatively ($r = -.64, p < .01$) and moderately positively ($r = .49, p < .001$) correlated with the firm being in the financial sector, both statistically significant. The negative and statistically non-significant relationship is shown between firm size and firm age ($r = -.04, p > .05$), and between the firm being in the financial sector and having announced a positive change in its earnings in the announcement ($r = -.13, p > .05$). Lastly, the relationship between firm size and having announced a positive change in earnings is positive but non-significant (($r = .03, p > .05$). Following the cut-off point in Pallant (2020) all these correlation coefficients are less than the .8, indicating absence of multicollinearity in the data.

Table 4.7 Pearson Correlation Analysis Results for DSEI

	CAAR -10-10	CAAR -5-5	CAAR -2-2	Age_Inc	LnTA	Financial	$\Delta EPS > 0$
CAAR-10-10	--						
CAAR-5-5	.76***	--					
CAAR-2-2	.84***	.82***	--				
Age_Inc	-.22*	-.20	-.25*	--			
LnTA	-.27*	-.25*	-.20	-.04	--		
Financial	-.09	-.12	-.06	-.64**	.49***	--	
$\Delta EPS > 0$	.13	.13	.08	.17	.03	-.13	--

$*.\rho < .05; **.\rho < .01; ***.\rho < .001\ (2-tailed)$

Notes: DSEI = All Share Index; CAAR = Average and cumulative average abnormal returns in the event window (T_1, T_2) in days; Age_Inc = Firm age since incorporation, LnTA = Natural logarithm of total assets; Financial = firm being in the financial sector; $\Delta EPS > 0$ = Announcement contained a positive change in earnings.

Table 4.8 shows how the cumulative abnormal returns (CAARs) over the different event windows based on the TSI are related to company characteristics, event characteristics and the industries in which companies operate; in particular, the firm's age, firm size, financial industry, and change in earnings.

The results show that the cumulative average abnormal returns over the 21days, i.e. $CAAR_{(-10,+10)}$, window are negatively and significantly correlated with firm size $(r = -.27, p < .05)$ negatively but non-significantly correlated with firm's age $(r = -.19, p > .05)$, and with the firm being in the financial sector $(r = -.12, p > .05)$. However, its relationship with the firm having announced a positive change in earnings during the announcement was positive but statistically non-significant $(r = .01, p > .05)$.

Moreover, the results in Table 4.8 show that the cumulative average abnormal returns over the 11-day window, i.e. $CAAR_{(-5,+5)}$, are only significantly negatively

correlated with the firm's size ($r = -.24, p < .05$), neither with the firm's age ($r = -.20, p > .05$) nor with the firm being operating in the financial sector ($r = -.12, p > .05$). The relationship was also positive with the firm having reported a positive change in earnings in the announcement but this relationship was statistically non-significant ($r = .06, p > .05$).

Finally, the results in Table 4.8 show that the cumulative average abnormal returns over the 5-day window, i.e. $CAAR_{(-2,+2)}$, is only significantly negatively correlated with the firm's age ($r = -.28, p < .05$), neither with the firm's size ($r = -.19, p > .05$) nor with the firm being operating in the financial sector ($r = -.04, p > .05$). The relationship was also positive with the firm having reported a positive change in earnings in the announcement but this relationship was statistically non-significant ($r = .19, p > .05$). The conclusion is similar to that of DSEI-based analysis that there is some evidence of linearity between the dependent variables – CAARs and firm's age and firm's size.

Similar to the DSEI, correlation analysis was done among the explanatory variables for the TSI. The results in Table 4.8 show similar correlation coefficient results between both firms' age ($r = -.64, p < .001$), and firm's size ($r = .49, p < .001$), and the firm being operation in the financial sector. The relationship between the Firm's age and the firm having announced a positive change in earnings was positive and statistically significant ($r = .26, p < .05$), but that of the firm's age and firm size and being in the financial sector were respectively positive ($r = .13, p > .05$), and negative ($r = -.13, p > .05$), but statistically non-significant.

Also, the relationship between the firm's age and the firm's size was negative but statistically non-significant ($r = -.04, p > .05$). The conclusions are similar in that they indicate an absence of multicollinearity in the data.

Table 4.8 Pearson Correlation Analysis Results For TSI

	CAAR -10-10	CAAR -5-5	CAAR -2-2	Age_Inc	LnTA	Financial	$\Delta EPS > 0$
CAAR-10-10	--						
CAAR-5-5	.83***	--					
CAAR-2-2	.82***	.78***	--				
Age_Inc	-.19	-.20	-.28**	--			
LnTA	-.27*	-.24*	-.19	-.04	--		
Financial	-.12	-.12	-.04	-.64***	.49***	--	
$\Delta EPS > 0$	.01	.06	.19	.26*	.13	-.13	--

$*.\rho < .05; **.\rho < .01; ***.\rho < .001\ (2-tailed)$

Notes: TSI = Tanzania Share Index; CAAR = Average and cumulative average abnormal returns in the event window (T_1, T_2) in days; Age_Inc = Firm age since incorporation, LnTA = Natural logarithm of total assets; Financial = firm being in the financial sector; $\Delta EPS > 0$ = Announcement contained a positive change in earnings.

4.5 Standard Multiple Regression Analysis Results

To test the remaining four hypotheses of the study (H2 – H5) a standard linear multiple regression analysis was performed to assess the effect of each of the four explanatory variables on window-based CAARs. The following multiple linear regression analysis (MLRA) model was used to explain the variability of abnormal returns resulting from the influence of selected explanatory variables.

$$CAAR_{t,T} = \propto + \beta_1 Firm\ age + \beta_2 Fir\ size + \beta_3 Financial + \beta_4 \Delta Earnings + \varepsilon_i$$

The data consisted of 88 earnings announcements, whereby results for DSEI and TSI are presented in Table 4.9 and 4.10 respectively.

Table 4.9 Multiple Regression Analysis Results DSEI

Variable	b	SE(b)	beta	p-value	VIF
CAAR-2-2					
Constant	6.71	3.14		.036	
Age_Inc	-0.09	0.03	-0.46	.002	2.05
LnTA	-0.12	0.29	-0.05	.684	1.60
Financial	-3.09	1.53	-0.34	.046	2.69
$\Delta EPS > 0$	-0.38	0.90	-0.04	.675	1.04
R^2	.15				
FStat.	3.65			.009	
CAAR-5-5					
Constant	13.42	5.02		.009	
Age_Inc	-0.13	0.05	-0.41	.005	2.05
LnTA	-0.31	0.46	-0.09	.505	1.60
Financial	-5.22	2.45	-0.35	.036	2.69
$\Delta EPS > 0$	-1.48	1.44	-0.115	.308	1.04
R^2	.16				
FStat.	3.96			.005	
CAAR-10-10					
Constant	22.27	7.86		.006	
Age_Inc	-0.20	0.07	-0.40	.007	2.05
LnTA	-0.87	0.72	-0.15	.232	1.60
Financial	-6.30	3.83	-0.27	.104	2.69
$\Delta EPS > 0$	0.28	2.26	0.01	.902	1.04
R^2	.16				
FStat.	3.79			.007	

Notes: DSEI = All Share Index; CAAR = Average and cumulative average abnormal returns in the event window (T_1, T_2) in days; Age_Inc = Firm age since incorporation, LnTA = Natural logarithm of total assets; Financial = firm being in the financial sector; $\Delta EPS > 0$ = Announcement contained a positive change in earnings. VIF = Variance inflation factor.

Table 4.10 Multiple Regression Analysis Results TSI

Variable	b	SE(b)	beta	p-value	VIF
CAAR-2-2					
Constant	*5.35*	3.32		.111	
Age_Inc	-0.09	0.03	-0.46	.002	2.14
LnTA	-0.08	0.29	-0.04	.779	1.60
Financial	-2.99	1.52	-0.32	.053	2.68
$\Delta EPS > 0$	0.77	0.92	0.09	.408	1.10
R^2	0.16				
FStat.	4.03			.005	
CAAR-5-5					
Constant	12.68	5.20		.017	
Age_Inc	-0.13	0.05	-0.44	.004	2.139
LnTA	-0.31	0.45	-0.09	.499	1.598
Financial	-5.10	2.38	-0.36	.035	2.679
$\Delta EPS > 0$	-0.55	1.44	-0.04	.703	1.097
R^2	0.15				
FStat.	3.61			.009	
CAAR-10-10					
Constant	19.37	6.73		.005	
Age_Inc	-0.16	0.06	-0.41	.007	2.14
LnTA	-0.67	0.58	-0.15	.255	1.60
Financial	-5.52	3.08	-0.30	.077	2.68
$\Delta EPS > 0$	-1.59	1.87	-0.09	.399	1.10
R^2	0.15				
FStat.	3.64			.009	

Notes: TSI = Tanzania Share Index; CAAR = Average and cumulative average abnormal returns in the event window (T_1, T_2) in days; Age_Inc = Firm age since incorporation, LnTA = Natural logarithm of total assets; Financial = firm being in the financial sector; $\Delta EPS > 0$ = Announcement contained a positive change in earnings. VIF = Variance inflation factor.

The results (Table 4.9) which are based on DSEI, show that the four explanatory variables jointly accounted for a significant 15% of the variance in CAAR(-2,+2) ($R^2 = .15, F(4,83) = 3.65, p < .01$), 16 % of the variance in CAAR(-5,+5),

($R^2 = .16, F(4,83) = 3.96, p < .01$), and 16% of the variance in CAAR(-10,+10), ($R^2 = .16, F(4,83) = 3.79, p < .01$). Firm's age has a negative and statistically significant effect on CAAR (-2, +2), ($b = -.09,\ p < .01$), CAAR (-5, +5), ($b = -.13,\ p < .01$), CAAR (-10, +10), ($b = -.20,\ p < .01$). Firm's size has a negative but statistically non-significant effect on CAAR (-2, +2), ($b = -.12,\ p = .684$), CAAR (-5, +5), ($b = -.31,\ p = 505$), CAAR (-10, +10), ($b = -.87,\ p = .232$). Being in the financial sector relative to the other industrial sectors (manufacturing and services) has a negative and statistically significant effect on Firm's age has a negative and statistically significant effect on CAAR(-2,+2), ($b = -3.09,\ p = .046$), CAAR(-5,+5), ($b = -5.22,\ p = .036$), but not on CAAR(-10,+10), ($b = -6.30,\ p = .104$). Lastly, announcements with a positive change in earnings had a negative but statistically non-significant effect on CAAR (-2, +2), ($b = -0.38,\ p = .675$), CAAR (-5, +5), ($b = -1.48,\ p = .308$), and positive and non-significant effect on CAAR (-10, +10), ($b = 0.28,\ p = .902$).

The results (Table 4.10) which are based on TSI, show that the four explanatory variables jointly accounted for a significant 16% of the variance in CAAR(-2,+2) ($R^2 = .16, F(4,83) = 4.03, p < .01$), 15% of the variance in CAAR(-5,+5), ($R^2 = .15, F(4,83) = 3.61, p < .01$), and 15% of the variance in CAAR(-10,+10), ($R^2 = .15, F(4,83) = 3.64, p < .01$). Firm's age has a negative and statistically significant effect on CAAR (-2, +2), ($b = -.09,\ p < .01$), CAAR (-5, +5), ($b = -.13,\ p < .01$), CAAR (-10, +10), ($b = -.16,\ p < .01$). Firm's size has a negative but statistically non-significant effect on CAAR (-2, +2), ($b = -.08,\ p =$

.779), CAAR (-5, +5), ($b = -.31,\ p = 499$), CAAR (-10, +10), ($b = -.67,\ p = .255$). Being in the financial sector relative to the other industrial sectors (manufacturing and services) has a negative and statistically non-significant effect on CAAR(-2,+2), ($b = -2.99,\ p = .053$), and CAAR(-10,+10), ($b = -5.52,\ p = .077$), but negative and statistically significant effect on CAAR(-5,+5), ($b = -5.10,\ p = .035$). Lastly, announcements with a positive change in earnings had a positive but statistically non-significant effect on CAAR (-2, +2), ($b = 0.77,\ p = .408$), and negative and statistically non-significant effect on CAAR (-5, +5), ($b = -0.55,\ p = .703$), and CAAR (-10, +10), ($b = -1.59,\ p = .399$).

4.6 Stepwise (Statistical) Multiple Regression Analysis Results

In the standard multiple regression analysis reported in the preceding section, Age since incorporation dominated as a significant negative predictor of CAARs in all three event windows. Operating in the financial sector, on the other hand, was shown a significant negative predictor of CAAR in both DSEI and TSI over the eleven-day window and only a significant negative predictor of CAAR in DSEI over the five-day window. The other two variables of firm size and positive change in earnings were non-significant predictors of CAARs in all three event windows irrespective of whether DSEI or TSI was used. However, while the effect of size was consistent, that of earnings change was contradictory – negative and non-significant predictor of the five-day window but positive and non-significant predictor in the 21-day window CAARs in the DSEI case. The opposite was the case when TSI was used. Consequent to the situation above, a stepwise (statistical) regression analysis was performed to ascertain the set of predictors that best explain the variability in the

CAARs in both DSEI and TSI. The results are presented in Table 4.11 for the DSEI case and Table 4.12 for the TSI case.

Table 4.11 presents the stepwise regression analysis results for DSEI. The stepwise regression concluded at Step 2 with firm age and the firm being in the financial sector jointly accounting for 15% of the variance in the five-day CAAR ($R^2 = .15, F(2,85) = 7.25, p = .001$). Both firm age ($b = -.10,\ p < .001$), and being in the financial sector ($b = -3.46,\ p = .005$), negatively and statistically significantly predicted the five-day CAAR, with firm age contributing more of the explanatory power ($beta = -.49,\ p < .001$), than being in the financial sector ($beta = -.38,\ p = .005$).

In the 11-day window CAAR, the regression model concluded at Step 4 with firm age and being in the financial sector accounting for 14% of the variance in the CAAR ($R^2 = .14, F(2,85) = 7.14, p = .001$). Both firm age ($b = -.15,\ p < .001$), and being in the financial sector ($b = -6.16,\ p = .002$) negatively and statistically significantly predicted the eleven-day window CAAR, with firm age contributing more of the explanatory power ($beta = -.47,\ p < .001$), than being in the financial sector ($beta = -.42,\ p = .002$).

Table 4.11 Stepwise Regression Analysis Results DSEI

Window	b	SE(b)	beta	ρ	R^2	ΔR^2	Fstat.
CAAR (-2, +2)							
Step 1					*0.06*	*0.06**	*5.72**
Constant	2.52	0.90		.006			
Age_Inc.	-0.05	0.002	-0.25	.019			
Step 2					*0.15*	*0.08***	*7.25***

Constant	5.35	1.31		<.001			
Age_Inc	-0.1	0.03	-0.49	<.001			
Financial	-3.46	1.20	-0.38	.005			
CAAR (-5, +5)							
Step 1					*0.06*	*0.06**	*5.57*
Constant	13.17	7.75		.007			
Ln (TA)	-0.89	0.38	-0.25	.021			
Step 2					*0.11*	*0.05**	*5.04***
Constant	16.09	4.87		.001			
Ln (TA)	-0.92	0.37	-0.25	.015			
Age_Inc.	-0.07	0.03	-0.21	.041			
Step 3					*0.15*	*0.04**	*4.92***
Constant	12.99	5.00		.011			
Ln (TA)	-0.34	0.46	-0.1	.458			
Age_Inc.	-0.13	0.05	-0.43	.004			
Financial	-5.05	2.44	-0.34	.041			
Step 4					*0.14*	*-0.01*	*7.14***
Constant	9.61	2.11		<.001			
Age_Inc.	-0.15	0.04	-0.47	<.001			
Financial	-6.16	1.93	-0.42	.002			
CAAR (-10, +10)							
Step 1					*0.07*	*0.07**	*6.88**
Constant	21.34	7.35		.005			
Ln (TA)	-1.54	0.59	-0.27	.010			
Step 2					*0.13*	*0.05**	*6.15***
Constant	26.23	7.51		<.001			
Ln (TA)	-1.58	0.57	-0.28	.007			
Age_Inc.	-0.11	0.05	-0.23	.027			

$*. p < .05$; $** p < .01$; $*** p < .001$

Notes: Ln (TA) = Natural log of Total Assets; Age_InC. = Firm age since incorporation; Financial = Firms in the financial sector; DSEI = Dar es Salaam Stock Exchange All Share Index; CAAR = Cumulative Average Abnormal Returns over the defined event window (T_1, T_2) in days$\Delta EPS > 0$ = Announcement contained a positive change in earnings.

Table 4.12 Stepwise Regression Analysis Results TSI

Window	b	SE(b)	beta	ρ	R^2	ΔR^2	Fstat.
CAAR (-2, +2)							
Step 1					*0.08*	*0.08**	*7.03**
Constant	2.56	0.90		.005			
Age_Inc	-0.05	0.02	-0.28	.010			
Step 2					*0.15*	*0.08***	*7.76****

Constant	5.32	1.31		<.001			
Age_Inc	-0.10	0.03	-0.51	<.001			
Financial	-3.37	1.20	-0.36	.006			
CAAR (-5, +5)							
Step 1					*0.06*	*0.06**	*5.29**
Constant	12.36	4.60		.009			
Ln (TA)	-0.84	0.37	-0.24	.024			
Step 2					*0.10*	*0.04**	*4.72**
Constant	15.09	4.72		.002			
Ln (TA)	-0.87	0.36	-0.25	.018			
Age_Inc	-0.06	0.03	-0.21	.049			
Step 3					*0.15*	*0.05**	*4.81***
Constant	11.99	4.85		.015			
Ln (TA)	-0.29	0.44	-0.08	.516			
Age_Inc	-0.13	0.04	-0.43	.004			
Financial	-5.06	2.36	-0.35	.035			
Step 4					*0.14*	*-0.004*	*7.05***
Constant	9.12	2.04		<.001			
Age_Inc	-0.14	0.04	-0.46	<.001			
Financial	-6.00	1.87	-0.42	.002			
CAAR (-10, +10)							
Step 1					*0.07*	*0.07**	*6.57**
Constant	17.29	5.91		.004			
Ln (TA)	-1.21	0.47	-2.66	.012			

$*. p < .05; ** p < .01; *** p < .001$

Notes: Ln (TA) = Natural log of Total Assets; Age_InC. = Firm age since incorporation; Financial = Firms in the financial sector; TSI = Tanzania Share Index; CAAR = Cumulative Average Abnormal Returns over the defined event window (T_1, T_2) in days; $\Delta EPS > 0$ = Announcement contained a positive change in earnings.

In the 21-day window CAAR, the regression model concluded at Step 2 with firm age and being in the financial industry accounting for 13% of the variance in the CAAR $(R^2 = .13, F(2,85) = 6.15, p = .003)$. Firm age $(b = -0.11,\ p < .05)$ negatively and statistically significantly predicted the 21-day window CAAR. At this Step however, the variable of being in the financial sector was replaced by firm size which negatively and statistically significantly affected the 21-day window CAAR $(b = -1.58,\ p < .01$ which also contributed more explanatory power $(beta =$

$-0.28,\ p < .05$) than firm age ($beta = -0.23,\ p < .05$. It can therefore be concluded that firm's age and being in the financial sector relative to being in the other sectors of manufacturing or services have a negative and significant effect on both the five-day window CAAR and the 11-day window CAAR. Additionally, while firm age negatively and statistically significantly affected the 21-day window CAAR, the same is also negatively and significantly affected by firm size.

Table 4.12 presents the stepwise regression analysis results for TSI. The stepwise regression also concluded at Step 2 with the firm age and the firm being in the financial sector jointly accounting for 15% of the variance in the five-day CAAR ($R^2 = .15, F(2,85) = 7.76, p < .001$). Both firm age ($b = -.10,\ p < .001$), and being in the financial sector ($b = -3.37,\ p < .01$), negatively and statistically significantly predicted the five-day CAAR, with firm age contributing more of the explanatory power ($beta = -.51,\ p < .001$), than being in the financial sector ($beta = -.36,\ p < .01$).

Just like in the DSEI case, in the 11-day window CAAR, the regression model concluded at Step 4 with firm age and being in the financial accounting for 14% on the variance in the CAAR ($R^2 = .14, F(2,85) = 7.05, p = .001$). Both firm age ($b = -.14,\ p < .001$), and being in the financial sector ($b = -6.00,\ p < .01$) negatively and statistically significantly predicted the eleven-day window CAAR, with firm age contributing more of the explanatory power ($beta = -.46,\ p < .001$), than being in the financial sector ($beta = -.42,\ p < .01$).

In the 21-day window CAAR, the regression model concluded at Step 1 with the firm's size alone accounting for 7% of the variance in the CAAR ($R^2 = .07, F(1,86) = 6.57, p = .012$). It can therefore be concluded that for the TSI case, the firm's age and being in the financial sector relative to being in the other sectors of manufacturing or services have a negative and significant effect on both the five-day window CAAR and the 11-day window CAAR. Additionally, only the firm's size negatively and statistically significantly affected the 21-day window CAAR.

4.7 Robustness Analysis

4.7.1 Testing for the Multivariate Non-Normality and Heteroscedasticity Assumptions

Following the selection of variables in the preceding section using stepwise regression analysis, firm age and financial sector were consistently shown to be significant negative predictors of CAARs in the 5-day and 11-day event windows irrespective of the price data used to estimate the expected returns (i.e., whether DSEI or TSI price data was used). Differences were observed in the 21-day window where firm size and firm age were significant predictors in the DSEI price-based model but in the TSI price-based model, only firm size was the significant predictor.

Table 4.13 Breusch-Pagan and White Tests for Heteroscedasticity Results - DSEI

	CAAR (-2, 2)			CAAR (-5, 5)			CAAR (-10, 10)		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
DSEI									
Breusch-Pagan	61.80	2	<.001	122.68	2	<.001	16.0	5	.007
Modified Breusch-Pagan (Koenker)	5.02	2	.081	8.02	2	.180	0.86	2	.650

White Test	27.94	4	<.001	28.58	4	<.001	5.90	2	.520
TSI									
Breusch-Pagan	34.88	2	<.001	99.95	2	<.001	9.19	1	.002
Modified Breusch-Pagan (Koenker)	3.37	2	.186	7.95	2	.190	1.41	1	.235
White Test	26.49	4	<.001	27.35	4	<.001	3.73	2	.155

Notes: CAAR = Cumulative average abnormal returns for window $(T1, T2)$ in days; DSEI = Dar es Salaam Stock Exchange All Share Index; TSI = Tanzania All Share Index.

Following the univariate analysis which produced high skewness and kurtosis statistics in the average and cumulative average abnormal return data (Table 4.1 for DSEI and Table 4.2 for TSI), the regression models in all windows were re-estimated and multivariate non-normality and heteroscedasticity assumptions were evaluated (Astivia & Zumbo, 2019; Hayes & Cai, 2007; Rosopa et al., 2013). The former was done using both histograms and P-P plots. The latter was done using both the scatter plots and the Breusch Pagan Tests (Breusch & Pagan, 1979) including the modified version of the Koenker test – (Koenker, 1981)) (Daryanto, 2020). In addition, the White test for heteroscedasticity was also applied because it is also capable of capturing heteroskedasticity where the functional relationship between the variances and the predictors is non-linear. The results are presented in Table 4.13. The histograms, scatter plots and the raw results of each test for heteroscedasticity are presented in Appendices 1 to 6.

Based on the DSEI, the results (Table 4.13) show that for the 5-day event window (-2,+2), both the Breusch-Pagan, $\chi^2_{(2)} = 61.80, \rho < .001$, and the White test, $\chi^2_{(4)} = 27.94, \rho < .001$, failed to support the null hypothesis that *the variance of the errors does not depend on the value of the independent variables*. The modified Breusch-

Pagan (Koenker) test on the other hand supported the hypothesis, $\chi^2_{(2)} = 5.02, \rho = .081$. A similar trend in the results is shown in the 11-day (-5, +5) window. The hypothesis is not supported using Breusch-Pagan, $\chi^2_{(2)} = 122.68, \rho < .001$, and the White test, $\chi^2_{(4)} = 28.58, \rho < .001$, but supported using the modified Breusch-Pagan (Koenker) test, $\chi^2_{(2)} = 8.02, \rho = .180$. The CAAR for the 21-day (-10, +10) window has slightly different results in which the null hypothesis is not supported by Breusch-Pagan, $\chi^2_{(5)} = 16, \rho = .007$, and supported by the White test, $\chi^2_{(2)} = 5.90, \rho = .520$. and the modified Breusch-Pagan (Koenker) test, $\chi^2_{(2)} = 0.86, \rho = .650$.

Table 4.13 also shows the heteroscedasticity results for the TSI – based data. The results are very similar to those that are based on DSEI data. Specifically, the null hypothesis that the variance of the errors does not depend on the values of the independent variables is only supported by the Koenker test, $\chi^2_{(2)} = 3.37, \rho = .186$, but not by Breusch-Pagan $\chi^2_{(2)} = 34.88, \rho < .001$ and White test $\chi^2_{(4)} = 26.49, \rho < .001$ in the 5-day (-2,+2) window. Similar results are obtained in the 11-day (-5, +5) window where the Null hypothesis is supported by the Koenker test $\chi^2_{(2)} = 7.95, \rho = .190$ but not by Breusch-Pagan $\chi^2_{(2)} = 99.95, \rho < .001$ and White test $\chi^2_{(4)} = 27.35, \rho < .001$. In the 21-day (-11, +11) window, the null hypothesis is supported by both the Koenker test $\chi^2_{(1)} = 1.41, \rho = .235$ and the White test $\chi^2_{(2)} = 3.73, \rho = .155$, but not by the Breusch-Pagan test $\chi^2_{(1)} = 9.19, \rho = .002$.

In conclusion, the modified Breusch-Pagan (Koenker) test has given support to the null hypothesis in all windows and both DSEI and TSI. Conversely, the Breusch-Pagan test has failed to support the null hypothesis in all windows and both DSEI and TSI. Since the Koenker test is considered more robust than the Breusch-Pagan test, homoscedastic variances may be assumed. However, since the White test is also capable of detecting heteroscedasticity in situations where the functional relationship between the variances and the predictors are non-linear, its conflicting results to those of the Koenker tests suggest action in the regression estimation. This is considered in the next section of the Bootstrapping regression analysis.

4.7.2 Correcting for Non-Normality, Small Sample Size and Heteroscedasticity Problem in the Data

Robustness checks on the regression analysis results were carried out following the evidence of non-normality and heteroscedasticity presence in the data. In addition, the sample size is limited to 88 events. Gignac (2019) suggests that applying bootstrapping-based estimation is among the ways to control for non-normality as it does not assume any level of normality.

However, while bootstrapping approaches provide a useful way of obtaining bootstrap confidence intervals that address any limitations due to non-normality residuals as well as sample size, it does not account for estimates when residuals are heteroscedastic (having non-constant variance of residuals). In such situations, Wild bootstrapping is recommended as it detects variances in situations where the

predictors are non-linear (Davidson & Flachaire, 2008; Wu, 1986). The results are presented in Tables 4.14 and 4.15.

Table 4.14 Regression Analysis Results with Bias-Corrected CIs (DSEI)

	b	SE(b)	p-value	BCa 95%CI for b	
				LL	UL
CAAR (-2, +2)					
Constant	5.35	2.68	.011	1.55	9.64
Age_Inc	-0.1	0.05	.029	-0.18	-0.02
Financial	-3.46	1.94	.045	-6.83	-0.35
CAAR (-5, +5)					
Constant	9.61	4.71	.002	2.65	16.52
Age_Inc	-0.15	0.08	.009	-0.26	-0.03
Financial	-6.16	3.40	.024	-11.60	-0.98
CAAR (-10, +10)					
Constant	26.23	11.13	.009	5.55	47.35
Ln (TA)	-1.58	0.72	.016	-2.84	-0.33
Age_Inc	-0.11	0.07	.155	-0.23	0.01

Notes: Ln (TA) = Natural log of Total Assets; Age_InC. = Firm age since incorporation; Financial = Firms in the financial sector; DSEI = Dar es Salaam Stock Exchange All Share Index; CAAR = Cumulative Average Abnormal Returns over the defined event window (T_1, T_2) in days. BCa = Bias - corrected and accelerated (Wild Bootstrapping – 1,000 samples); LL = lower limit; UL = upper limit

The results in Table 4.14 show that CAARs over the 5-day (-2, +2) window are significantly negatively explained by firm's age $b = -0.10,\ \rho = .029, BCa\ 95\%\ CI[-0.18, -0.02]$ and the firm been in the financial sector relative to being in other sectors (manufacturing and services sectors) $b = -3.46,\ \rho = .045, BCa\ 95\%\ CI[-6.83, -0.35]$. Similarly, the CAARs over the 11-day (-5, +5) window are significantly negatively explained by firm's age $b = -0.15,\ \rho = .009, BCa\ 95\%\ CI[-0.26, -0.03]$ and the firm been in the financial

sector relative to being in other sectors (manufacturing and services sectors) $b = -6.16,\ \rho = .024, BCa\ 95\%\ CI[-11.60, -0.98]$. These results confirm the earlier results before carrying out the robustness check analysis. However, some changes are observed in the 21-day (-10, +10) window. In this window, the CAARs are negatively and significantly explained by firm size $b = -1.58,\ \rho = .016, BCa\ 95\%\ CI[-2.84, -0.33]$ but negative but not significantly explained by firm age $b = -.11,\ \rho = .155, BCa\ 95\%\ CI[-0.23, +0.01]$. This implies that firm age no longer explains the variance in the 21-day window CAARs after controlling for sample, size, non-normality and heteroscedasticity in the data.

The results in Table 4.15 show that CAARs over the 5-day (-2,+2) window are significantly negatively explained by firm's age $b = -0.10,\ \rho = .029, BCa\ 95\%\ CI[-0.18, -0.01]$ and the firm been in the financial sector relative to being in other sectors (manufacturing and services sectors) $b = -3.47,\ \rho = .048, BCa\ 95\%\ CI[-6.64, -0.22]$. Similarly, the CAARs over the 11-day (-5, +5) window are significantly negatively explained by firm's age $b = -0.14,\ \rho = .010, BCa\ 95\%\ CI[-0.25, -0.03]$ and the firm been in the financial sector relative to being in other sectors (manufacturing and services sectors) $b = -6.00,\ \rho = .028, BCa\ 95\%\ CI[-11.34, -0.76]$.

Table 4.15 Regression Analysis Results with Bias-Corrected CIs (TSI)

	b	SE(b)	p-value	BCa 95%CI for b	
				LL	UL

CAAR (-2, +2)					
Constant	5.32	2.69	.007	1.03	9.51
Age_Inc	-0.10	0.05	.029	-0.18	-0.01
Financial	-3.37	1.90	.048	-6.64	-0.22
CAAR (-5, +5)					
Constant	9.12	4.33	.002	2.83	15.30
Age_Inc	-0.14	0.08	.010	-0.25	-0.03
Financial	-6.00	3.16	.028	-11.34	-0.76
CAAR (-10, +10)					
Constant	17.29	7.33	.010	4.67	29.46
Ln (TA)	-1.21	0.56	.027	-2.31	-0.05

Notes: Ln (TA) = Natural log of Total Assets; Age_InC. = Firm age since incorporation; Financial = Firms in the financial sector; TSI = Tanzania Stock Exchange All Share Index; CAAR(-t,+t) = Cumulative Average Abnormal Returns over the defined event window (T_1, T_2) in days. BCa = Bias - corrected and accelerated (Wild Bootstrapping – 1,000 samples); LL = lower limit; UL = upper limit

Over the 21-day (-11, +11) window, the results show that the CAARs are negatively and significantly explained by firm size $b = -1.21,\ \rho = .027, BCa\ 95\%\ CI[-2.31, -0.05]$. The results in all three event windows convey the same information as was the case before carrying out the robustness check analysis. Moreover, comparing the results based on the DSEI with those that are based on TSI, similar information/conclusions have not been conveyed. That is, irrespective of the market data used to estimate the abnormal returns, the CAARs over the 5-day window and 11-day window are significantly negatively explained by firm age and financial sector while the CAARs over the 21-day window are significantly negatively explained by firm size.

4.8 Summary of the Chapter

The results presented in the chapter show that earnings announcements by firms listed on the Dar es Salaam Stock Exchange in Tanzania are met with statistically significant stock price reactions in the post-announcement period indicating that the stock prices slowly incorporate new information. Similar results are reported irrespective of whether DSEI–based market prices or TSI-based market prices are used to estimate abnormal returns and therefore the CAARs. Furthermore, the results show that, in both DSEI and TSE cases, the magnitude of the five-day window and 11-day window CAARs are significantly negatively affected by the firm's age and the announcing firm being in the financial sector, while 21-day window CAARs are significantly negatively explained by firm size.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 An Overview

This chapter discusses the findings of the study *"Stock price response to earnings announcements: Evidence from the Tanzanian stock market,"* which were presented in chapter four. The discussion relies on the study objectives, hypotheses and related literature.

This chapter is divided into four sections. Section two presents the research aim and hypotheses while the summary of the findings is reported in section three. Section four provides results interpretation; starting with the observed Abnormal returns, then the effect of firm age, firm size, and industry and finally the effect of earnings change.

5.2 Research Aim and Hypotheses

The main objective of the study was to ascertain the extent to which stock prices respond to public earnings information by companies listed on the DSE. The first specific objective was to evaluate the abnormal returns around companies' public earnings announcements. Other objectives were to determine the effects of the firm's age, announcing firm's size, industry, and change in earnings on the abnormal returns around earnings announcements.

The intention was to answer the overall research question; "How do share prices at the DSE react to information made available to the market?" The initial specific question was; To what extent do the observed returns differ from normal returns around companies' public earnings announcements? Other research questions were; Does the industry in which the announcing firm operates explain the level of abnormal returns around the earnings announcement events? Does announcing firm's size, firm's age, and change in earnings explain the abnormal returns around the earnings announcement events?

The approach employed was to test research hypotheses raised in previous chapters; i.e. H_1: Cumulative average abnormal return is not equal to zero; H_2: Firms' age has a negative impact on the level of average abnormal return; H_3: Companies' sizes have a negative impact to the level of average abnormal return $H_{4:}$ Industries in which companies operate influence negatively the level of average abnormal return; H_5: Change in earnings has a positive influence on the level of average abnormal return.

5.3 Summary of the Findings

This study sought to establish the extent to which stock prices respond to earnings announcements of companies listed on the DSE. The stock market was analyzed in the semi-strong form of the EMH. Abnormal returns were examined in the 21-trading day window centred around the annual earnings announcements. The market model was used to estimate expected stock returns in the event window. The study also sought to establish whether a firm's age, firm's size, industry in which companies operate, and change in earnings, influence the efficiency of the stock market around the announcement period. The research results were achieved using the methodology set out in Chapter Three and were then presented in Chapter Four. Specifically, the chapter presents findings of data analysis based on the research objectives, questions and hypotheses of the study. Starting with descriptive analysis which results were presented in Tables 4.1 to 4.4 and Figures 4.1 and 4.2; then multiple regression analysis was performed of which empirical results indicating how hypotheses responded to the predictor variables were summarized in Tables 4.5 to 4.10. In addition, stepwise regression was conducted to reveal predictors that best explain the variability in the response variable. The results are presented in Tables 4.11 and 4.12. The overall analysis of the regression results reveals the following:

Hypothesis 1

The first hypothesis addressed a specific question; to what extent do the observed returns differ from normal returns around companies' public earnings announcements? The hypothesis posited that cumulative abnormal return around the

event day is not equal to zero. The study found that stock prices had a significant Abnormal return on post-event days. Specifically, on +3 day through +10 day in terms of the CAAR t-statistics, for both DSEI and TSI. In addition, the 11- and 21-day windows were statistically positively significant at 0.1% and 5% levels for DSEI and 0.1% and 1% levels for TSI respectively. Therefore, this suggests that the overall effect of earnings announcements on stock returns is positive and significant rejecting the null hypothesis that cumulative abnormal returns around event day are zero.

These findings are similar to those of Sponholtz (2005) in developed markets and Afego (2015), Dangol and Bhandari (2019), Kumar et al. (2020), Mlonzi et al. (2011), Osei (2002), and Syed and Bajwa (2018), in the developing markets. The studies established an increase in the stock price for good news announcements and a decrease of the same for bad news announcements that lead to strong positive and negative average abnormal returns respectively. Overall, it can be concluded that the DSE is not semi-strong efficient. Consequently, investors may be able to gain above-average returns following earning announcements by listed companies, holding other factors like transaction cost, constant.

Hypothesis 2

The second hypothesis posited that firms' age has a negative impact on the level of cumulative average abnormal returns around the announcement day. The findings show that firm age negatively and significantly affected the five-day, and 11-day window CAARs based on both DSEI and TSI. Firm age also had a negative and

significant effect on the 21-day window CAAR only based on DSEI. However, controlling for non-normality and heteroscedasticity problems in the data, the hypothesis was no longer supported in this window. The hypothesis was therefore supported in all cases except in the 21-day window CAAR based on both DSEI and TSI price data. These results imply that older firms are more experienced, more known to the public, full of history and are also able to make quality information available. Thus, when they announce earnings, little is in them as a surprise, lowering the extent to which investors react in response. The results are similar to the study by Smith and Watts (1992) who established that firm's age might be negatively related to its cumulative abnormal returns. In addition, the work done by Schultz (2004) and Jin (2000) indicated that the magnitude of investors' reactions might be influenced by the firm's age.

Similarly, Sare and Esumanba (2013) established a strong relationship between firms' age and cumulative abnormal returns on the Ghana Stock Exchange. However, contrary to Tanzania's Stock Market, Sare and Esumanba's study showed that firm's age was positively related to cumulative abnormal returns. The reason provided behind this result is that though the news may not be surprising to older firms because they could have anticipated it, a positive relation might explain more confidence in older firms than younger ones. This most likely supported the claim made by Ferri and Jones (1979), Titman and Wessels (1988), and Rajan and Zingales (1995) that, more established companies are seen as having greater trustworthiness by investors than smaller, newer companies.

Hypothesis 3

The third hypothesis posited that firm's size (defined as the natural log of the firm's total asset value in the announcement year) has a negative impact on the cumulative average returns around the announcement day. The findings show that firm size only negatively and significantly affected the 21-day window CAARs based on both DSEI and TSI. These findings are consistent with the findings of Chan et al. (2005), and Christensen et al. (2004), who reported that a firm's size is a significant determinant of how its stock price reacts. In addition, the results by Hatem (2015), that firm size adversely affects abnormal returns are in support of the hypothesis. However, the present study's findings are contrary to those of Alzahrani (2010), who suggested that the drift in stock prices is more significant for small companies.

The coefficient of large firms in 11- and 5-day windows was negative but not statistically significant. It indicates a negative relationship with abnormal returns in earnings announcements, suggesting that a firm's size is not a determinant of stock price reactions to the earnings announcements in the shorter event window. This finding is similar to that of Chan et al. (2005), who found that the firm size exerts no strong influence on earnings announcements within the three-day event window. This means that more information is available about these firms to the market. The negative relationship for large firms is consistent with the findings of Cressy and Farag (2011), who found a negative correlation between firm size and cumulative abnormal returns. Thus, it can be concluded that large companies listed on the Tanzania stock market, a frontier market, tend to have negative abnormal returns

around the earnings announcement period and that they significantly explain the level of abnormal returns in a longer event window.

Hypothesis 4

Hypothesis four posited that the industry in which companies operate (financial) influences negatively the level of cumulative average abnormal returns around the event day. The findings show that being in the financial sector relative to being in the manufacturing or services has a negative and statistically significant effect on the five-day and 11-day window CAARs based on both DSEI and TSI. This result is contrary to the study on the Ghana Stock Exchange by Sare and Esumanba (2013) who observed that firms belonging to the manufacturing industry respond quickly leading to positive abnormal returns compared to firms in other industries. Conclusively, both studies agree that the industry in which a firm operates has a significant impact on abnormal returns. However, they differ in relation to abnormal returns and the sector of significance. While in the Tanzanian Market, a frontier market, the financial industry is negatively significant to abnormal returns, in the Ghana stock market, an emerging market, the manufacturing industry is positively significant to abnormal returns.

Hypothesis 5

The fifth hypothesis posited that a positive change in earnings has a positive influence on the cumulative average abnormal returns around the announcement days. The findings show that changes in earnings have positive non-significant effects on abnormal returns across all examined windows. Impliedly, this indicates that the

sample market responds more strongly to bad news than to good news. This suggests that positive changes in earnings announcements contain information which is not reactive to investors in the Tanzanian Market, a frontier market and that changes in earnings announcements do not explain the variability of abnormal returns around earnings announcement days. This result is in line with Syed and Bajwa (2018) who suggested that the bad news samples cause a stronger market reaction as compared to good news samples, particularly on announcement day. On the contrary, Landsman and Maydew (2002), established that stock prices typically rise following good earnings surprises and vice versa. However, this factor was excluded in the analysis in the stepwise regression analysis.

5.4 Results Interpretation

First, the study estimated the size and significance of the abnormal returns around the announcement day (H_1). Subsequently, the study determined whether the firm and event-level variables (age, size, industry and change in earnings) together explain the variability in the abnormal returns (H_2- H_5)

5.4.1 Abnormal Returns

The first hypothesis to be tested was: *"H_1: Cumulative average abnormal return is not equal to zero"*. This is an alternative hypothesis to the null hypothesis which has been expressed as "the cumulative mean abnormal return in the period surrounding the event day is zero". The hypothesis was derived from EMH theory, that stocks always trade at their fair value, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. The test was conducted to

answer the general research question; How do share prices at the DSE react to information made available to the market?

The study found that there is a positive stock price reaction to annual earnings announcements (i.e., positive abnormal returns) around the event day. However, the occurrence of prolonged significant abnormal returns after the announcement's day suggests a delay in reacting to information, which is the expression of market inefficiency. Lack of or slow absorption of published earnings announcements information among investors might be among the reasons for the existence of extended abnormal returns. Scholars argued that a lack of expertise and information hinders investors from fully and accurately reacting to an event (Felimban, Floros & Nguyen, 2018; Sutejo & Utami, 2020). Thus, DSE is not efficient in Semi-strong form as extra profit may be earned using information disclosure. This result is in line with the findings of Dangol and Bhandari (2019) who rejected a semi-strong form of EMH in the Nepalese stock market following earnings announcements. Similar results are reported on the Saudi Stock Exchange (Kumar, Soni, Hawaldar, Vyas, & Yadav, 2020; Syed & Bajwa, 2018). The key issue here is that it is likely for investors to realize excess returns by trading around the announcement date. However, whether such returns can absorb the associated cost is still debatable.

5.4.1 Effect of Age Since Incorporation

Knowing that listed companies differ in terms of the number of years since incorporation, the study was keen to answer the question "Does the announcing firm's age explain the abnormal returns around the earnings' announcement events?".

The assumption was that; the stock price response to earning announcements by a well-known company might be different from that of an unpopular company.

The multiple regression model results provide empirical support for Hypothesis H_2, suggesting that; Firms' age has a negative impact on the level of cumulative average abnormal returns. Specifically, an increase in age is significantly associated with a decrease in cumulative average abnormal returns. Stepwise regression results validate this finding; showing that a firm's age is consistently a significant negative predictor across all time windows. These findings suggest that older companies have greater history, experience, public recognition, and the capacity to provide high-quality information. As a result, when businesses report earnings, investors are less likely to be surprised by what they hear. This most certainly confirmed the assertions of Ferri and Jones (1979), Rajan and Zingales (1995), Sare and Esumanba (2013), Schultz (2004) Smith and Watts (1992) Titman and Wessels (1988), and others that investors view larger, more established enterprises as more trustworthy than smaller, less established ones. Therefore, the findings show that the stock price reaction to earnings announcements is lesser for older firms.

5.4.3 Effect of Firm Size

Based on the view that; Earnings announcements are generally viewed as more informative for smaller firms because they have little pre-disclosure information (Ball, & Shivakumar, 2008; Bamba, 1987), resulting in lower information production outside their earnings-announcement windows (Collins, Kothari, & Rayburn, 1987); It was hypothesized that: *"H_3: firms' size has a negative impact to the level of*

cumulative average abnormal returns". The hypothesis is in line with the question; "Does the announcing firm's size explain the abnormal returns around the earnings' announcement events?". The natural log of Total Assets (LnTA) was used to represent the firm's size.

The multiple regression results indicate a negative relationship with abnormal returns but this relationship was not statistically significant at any studied window, suggesting that a firm's size employs no strong influence on stock price response to the earnings announcements. However, stepwise regression results in DSEI are consistent with that of TSI, showing that firm's size remains a significant negative predictor of abnormal returns, especially in the longer window. This conclusion survived even after controlling for the non-normality and heteroscedasticity in the data. This implies that large companies that are listed on the frontier Tanzanian stock market tend to have negative abnormal returns during the period of earnings announcements and that they provide an explanation for the abnormal return level over a longer period of time. These findings support Hatem's (2015) research findings which indicate that firm size negatively affects abnormal returns. Moreover, Chan et al. (2005), Christensen et al. (2004) and Cressy and Farag (2011) all confirmed that the size of a firm plays a significant role in determining its stock price response. Nonetheless, this does not apply in a shorter window (Chan et al., 2005). The abnormal return will therefore be lower for larger firms because they are more capable of releasing more quality information to the market such that when they make their announcement, the information contained therein is no longer a surprise to the market.

5.4.4 Effect of Industry

The fourth hypothesis to be tested was: *"H_4: Industries in which companies operate influence negatively the level of cumulative average abnormal return".* This hypothesis aimed to answer the question "Does the industry in which the announcing firm operates explain the level of abnormal returns around the earnings announcement events?". The results show a significant negative effect on the abnormal returns, thus, supporting the hypothesis. The frequency of provision of earnings information to the public could be the reason behind this finding. The more the availability of public earnings information to the market, the lesser the chance that the individual participant to make abnormal returns. Companies in the financial industry are required to publish their financial statements quarterly, which is not the case for companies in other industries where the mandatory requirement rests at the end of each accounting period. These results are consistent with stepwise regression findings, whereby the financial industry shows a strong and consistent negative impact on CAAR. This conclusion survived even after controlling for the non-normality and heteroscedasticity in the data. These results conform to the empirical results by Al-Shawawreh and Al-Tarawneh (2015), Alzahrani and Skerratt (2010), and Sare and Esumanba (2013) which shows that the industry type or sector is a significant determinant of abnormal returns. However, while Sare and Esumanba (2013) established that the manufacturing industry is positively significant to abnormal returns on the Ghana stock market, an emerging market, this study found that a firm operating in the financial industry relative to operating in either the manufacturing or service industry has its CAARs around the 5-dy and 11-day event windows

negatively significantly affected around the announcement event on the frontier Tanzanian Market.

5.4.5 Effect of Earnings Change

The hypothesis to be tested here was *"H_5: Positive change in earnings has a positive influence on the level of cumulative average abnormal return"*. The hypothesis was developed from the question; Does change in earnings (current event's earnings relative to the preceding year's earnings) explain the abnormal returns around the earnings' announcement events? The analysis was carried out to observe whether changes in earnings influence stock price response.

The hypothesis was rejected as both models, the multiple regression and stepwise regression results on the variable in question displayed a non-significant effect on the abnormal returns across all examined windows. This means that; positive changes in earnings do not have a reliable effect in either of the models, as the effect is minimal and not substantial. This implies that positive changes in earnings announcements in the Tanzanian market, a frontier market, do not provide new information to investors and do not account for the fluctuations in abnormal returns during earnings announcement periods. This finding aligns with Syed and Bajwa's (2018) suggestion that negative news samples elicit a stronger market response compared to positive news samples, especially on the day of the announcement. On the other hand, Landsman and Maydew (2002) found that stock prices tend to increase after positive earnings surprises and decrease after negative ones.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 An Overview

This study investigated the influence of earnings announcements on stock prices. It also examined the efficiency of the DSE in the semi-strong form and explored the determinants of abnormal returns resulting from these announcements to understand the behaviour of the market. The main objective of this study was to examine stock price responses to earnings information made available to the market by companies listed on the DSE, of which findings and discussion thereof were presented in preceding chapters. This chapter, therefore, will conclude the study by summarizing the key research findings in relation to the research aim and questions as well as the value and contribution thereof. It will also review the limitations of the study and propose opportunities for future research.

6.2 Research Methods Used

The main focus of this study was to contribute to the body of knowledge on the efficiency of markets in particular frontier markets like Tanzanian markets. The study aimed to ascertain the extent to which stock prices respond to public earnings information by companies listed on the DSE. The analysis involved tracking share prices around earnings announcement events. The final data used for analysis consisted of 88 earnings announcements, issued by 17 listed companies. The study adopted the standard event study methodology in which the event window and estimation window were set at 21 and 80 trading days. Parameters α and β were estimated using the market model.

6.3 Summary of the Findings

The study, firstly, stressed the impact of earnings announcements on stock prices at the DSE. In response to the first specific research question; to what extent do the observed returns differ from normal returns around companies' public earnings announcements? The results showed a significant Abnormal return on post-event days (+3 to +10 days), suggesting that stock market participants do not promptly re-estimate stock prices, causing stock prices to fluctuate several days later. The existence of prolonged abnormal returns indicates a lag in the market's response to earnings announcement which suggests that DSE is inefficient in the semi-strong form of the EMH. Secondly, the study provided explanations on which companies' specific variables (age, size, industries, and change in earnings) influence the stock price response to earnings announcements. The results were achieved using first, multiple regression and then, stepwise regression. The wild bootstrapping technique was also used to control for the evidenced non-normality and heteroscedasticity problems in the data.

The second specific question was "Does announcing a firm's age explain the abnormal returns around the earnings' announcement events?" The results revealed that older firms experienced significantly more negative price reactions around the announcement event, over the 5-day and 11-day event windows. Companies that have been in existence for more years are likely to be popular and well-known to market participants in such a way that their financial status is predictable. In this case, the chances of gaining abnormal returns are minimal compared to newly established companies.

The third research question was; does announcing firms' size explain the abnormal returns around the earnings announcement events? The results suggested that the firm's size, as measured by the natural log of total asset value in the annual earnings announcement, had a negative impact on the cumulative average returns around the announcement day. The results indicate that firm size had a consistently negative and significant impact on the 21-day window CAARs according to both DSEI and TSI, but not in the shorter event windows.

In response to the fourth specific question; does the industry in which the announcing firm operates explain the level of abnormal returns around the earnings announcement events? The analysis reveals that the financial industry has a negative significant impact on the cumulative average abnormal return in the 5-day and 11-day event windows irrespective of the price data used to estimate the expected returns. The reason behind this finding could be the fact that companies in the financial industry are highly regulated in such a way that their financial information is known to several participants since their financial reports are published quarterly and no surprise when it comes to annual financial reports. In this case, it is easier to predict market trends, resulting in a difficult scenario for an individual market participant to make abnormal returns based on the annual information provided.

The fifth hypothesis posited that a positive change in earnings announcement has a positive effect on the announcement firm's CAARs around the announcement days. The results indicate that fluctuations in earnings have a slight positive impact on

abnormal returns in all windows analyzed. This suggests that the sample market reacts more strongly to negative news as opposed to positive news. This implies that positive earnings announcements in the Tanzanian Market, a frontier market, provide non-reactive information to investors and that changes in earnings reports do not account for the fluctuations in abnormal returns during earnings announcement periods. However, the stepwise regression omitted this fact in the model.

6.4 Conclusions

This study examined the impact of earnings announcements on stock prices and the efficiency of the DSE in Tanzanian markets. It aimed to assess the market behaviour and the determinants of abnormal returns resulting from these announcements. The research used 88 earnings announcements from 17 listed companies, with event and estimation windows of 21 and 80 trading days. The study assessed whether firm age, firm size, industries, and positive earnings change determine the level of abnormal returns around event day.

The study established the presence of lags in the market's response to earnings announcements at the Dar es Salaam Stock Exchange (DSE). Specifically, the presence of significant abnormal returns several days after the announcement indicates that the market does not fully and promptly adjust stock prices to reflect new information. This suggests that the DSE exhibits inefficiency in the semi-strong form of the Efficient Market Hypothesis (EMH), which posits that all publicly available information should be quickly and accurately incorporated into stock prices. Older firms tend to experience more negative price reactions around earnings

announcements compared to younger firms. This might be due to the higher predictability of financial performance for well-established companies, leading to less potential for abnormal returns. Investors might already have better expectations of older firms' performance, leading to minimal abnormal returns.

Larger firms (as indicated by total asset value) show a negative impact on cumulative average abnormal returns around earnings announcements. This effect is particularly pronounced in longer event windows (21 days), suggesting that larger firms may be less prone to significant abnormal returns, potentially due to their established market presence and more predictable financial outcomes. Companies in the financial sector exhibit a significant negative impact on cumulative average abnormal returns in the days surrounding earnings announcements. This is likely because financial firms are highly regulated, and their financial performance is more transparent and predictable due to reporting frequency. As a result, there is less opportunity for investors to earn abnormal returns based on financial information. Positive changes in earnings announcements have a slightly positive but non-significant effect on the cumulative average abnormal returns. However, this variable was eliminated by the stepwise regression algorithm. Overall, the findings suggest that the DSE is characterized by delayed market reactions to earnings announcements and that firm-specific factors (age, size, and industry) influence the extent of cumulative average abnormal returns.

6.5 Contributions of the Study

This study builds on and complements studies focused on examining whether public earnings announcements contain value-relevant information and whether stock

markets react quickly and efficiently to this information (Dangol & Bhandari, 2019; Kumar, Soni, Hawaldar, Vyas, &Yadav, 2020; Messo & Byaruhanga, 2019; Olang & Akenga, 2017; Syed & Bajwa, 2018). The study followed the EMH testing studies in which there have been debates between the hypotheses' supporters and challengers. This study has been conducted on DSE, a frontier market, unlike other studies which mostly were conducted on developed markets with few on emerging markets. Therefore, this study has the potential to advance the theoretical understanding of market efficiency and investor behaviour in frontier markets, provide practical insights for investors and policymakers, and contribute methodologically to the field of finance.

6.5.1 Theoretical Contribution

The main output of this study suggests that DSE is inefficient in a semi-strong form. Theoretically, this finding on how markets respond to earnings announcements contributes to the literature on market efficiency and eventually, contributes to the debate on whether EMH holds, particularly in frontier markets which are less developed than emerging and developed markets.

The insights offered by this study, into whether frontier markets exhibit efficient market behaviour or have anomalies in response patterns, enrich theories related to investor sentiment and market reactions as the analysis of abnormal returns and provide evidence on how investors' behaviour in frontier markets differs from that in more established markets.

Other research outputs reveal the influence of industry and firm characteristics (age and size) on stock price reactions. Thus, the research contributes to theories about the impact of industry-specific factors on stock price reactions. Understanding how different industries react to earnings announcements in frontier markets extends existing knowledge about sector-based investor behaviour. Further, the study provides theoretical insights into how firm age, size, and financial sector influence stock prices, contributing to the broader understanding of how these variables affect market efficiency and investor response.

6.5.2 Practical Contribution

The DSE was established in 1996 and effectively became operational in 1998. Besides operating for several years and joining membership in regional and world stock exchanges, it was regarded as an unclassified stock market until 2020 when classified as a frontier market. As an infant market, fewer studies on weak form efficiency exist and are even scantier on semi-strong efficiency. Contextually, this study contributes to knowledge about the EMH from a frontier market in an effort to fill the knowledge gap by adding new empirical findings through testing the informational efficiency of the market.

Practically, the findings of this study are useful to various stakeholders to support their decision-making process. The decisions may include the development of investment strategy through abnormal returns patterns; utilizing market dynamics through frontier market characteristics; regulatory insights in particular policy implications**;** and corporate communication based on earnings announcement strategies as explained here under. Investors and financial analysts in frontier

markets could use the findings to better predict stock price movements around earnings announcements, thus refining investment strategies and timing decisions based on expected abnormal returns. For example, given the identified market inefficiency, investors can act on receiving earnings announcements. However, whether such returns would adequately absorb the associated transaction cost to realize a meaningful profit is still debatable.

The study's findings could help practitioners understand the specific dynamics of frontier markets, which are often characterized by lower liquidity and higher volatility compared to more developed markets. This knowledge could assist in crafting better financial products and strategies suited for these markets. Regulators and policymakers in frontier markets might use the study's insights to improve market transparency and efficiency. For instance, this study reveals significant inefficiencies that could drive reforms aimed at improving the accuracy of earnings disclosures or the timeliness of market reactions. Companies listed in frontier markets could use the research to better understand how their earnings announcements impact stock prices. This could lead to more strategic timing and communication of financial information to optimize market responses and mitigate negative reactions.

6.5.3 Methodological Contribution

Methodological contribution from this study may be seen through a careful review of the same. For instance, the research results of this study were achieved using the methodology set out in Chapter Three. From the methodology used and empirical

results based on hypothesis testing, researchers may come up with innovative analyses of the methodology that fits in the frontier markets. For instance, the approach used in this study to analyse stock price responses in a frontier market context could lead the researcher to introduce new methodologies or adapt existing ones to better fit the unique characteristics of such markets. Thus, serves as a model for future research in similar or other less-studied markets. Similarly, by testing hypotheses related to firm age, size, industry effects, and earnings changes, the study offers empirical evidence that supports or challenges existing theories, thereby providing a basis for future research to build upon.

6.6 Limitations of the study

This research constitutes a fresh and thorough attempt to investigate how the stock market responds to annual earnings announcements. There are some drawbacks to this study, though, and they can be addressed in the next research. This study was restricted to non-crosslisted companies in the DSE. The analysis was restricted to companies' annual earnings announcements and daily stock returns for the period from 2007 to 2021.

The entire population were subjected to inclusion and exclusion criteria. Those with missing data points, either as a result of non-trading or lack of financial and market information, were excluded from the sample. Out of 194 annual earnings announcements expected only 167 events were retrieved over the period. The final data used for analysis consisted of 88 earnings announcements, issued by 17 listed companies out of 21 which was initially expected. The study has further examined

only four explanatory variables namely, the industry in which companies operate, the firm's size, the firm's age and change in earnings leaving behind other potential variables.

6.7 Recommendations for Future Studies

In this section, we highlight possible areas of interest for future research themes and needs, specifically on informational efficiency in frontier markets. Based on limitations identified in the previous section a number of future studies could be recommended. Based on the availability of data, future studies could increase the investigation period from 2021 to the most recent possible period. Similarly, the studies could include cross-listed companies to enable the comparability between the current and future findings. Furthermore, future studies could examine other predictors of abnormal returns on top of, or separate from the currently investigated variables. This study used the market model to estimate expected returns; future studies could use other available models such as the capital assets pricing model, multi-factor models, and market-adjusted return model to mention but a few. Moreover, future studies could examine variables of informational efficiency other than earnings announcements since they also explain the level of market efficiency as suggested by EMH.

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Kieschnick, R., & Moussawi, R. (2018). Firm age, corporate governance, and capital structure choices. Journal of Corporate Finance, 48, 597-614.

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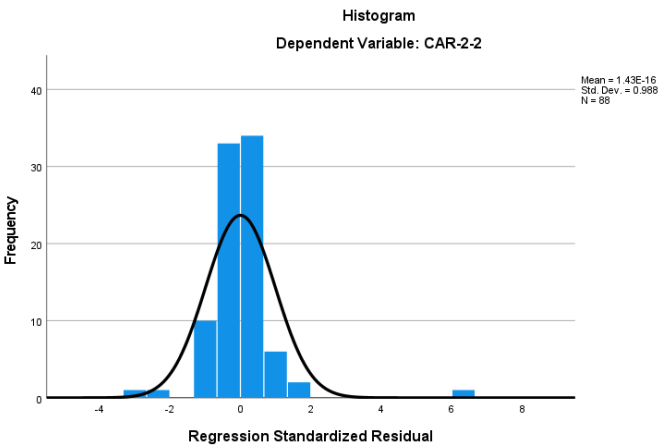
APPENDICES

Appendix 1. Normality, homoscedasticity and non-linear relationship tests for CAAR (-2,+2) DSEI



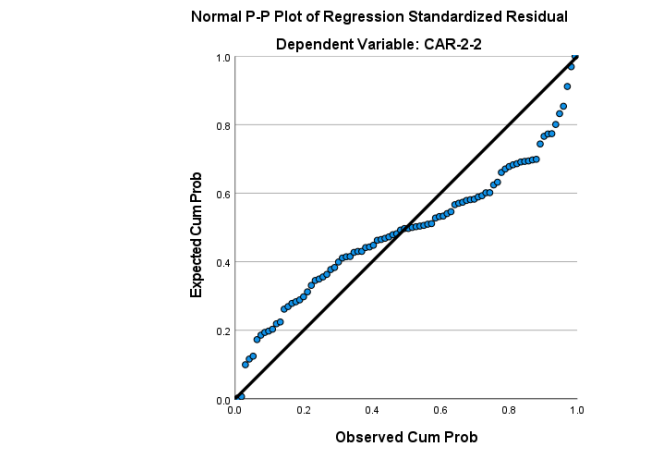
Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
61.804	2	<.001

a. Dependent variable: CAAR-2-2

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1



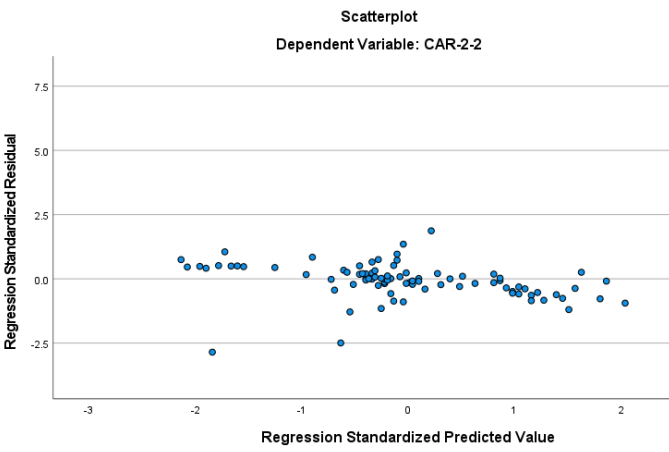
Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
5.020	2	.081

a. Dependent variable: CAAR-2-2

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1



White Test for Heteroskedasticity[a,b,c]

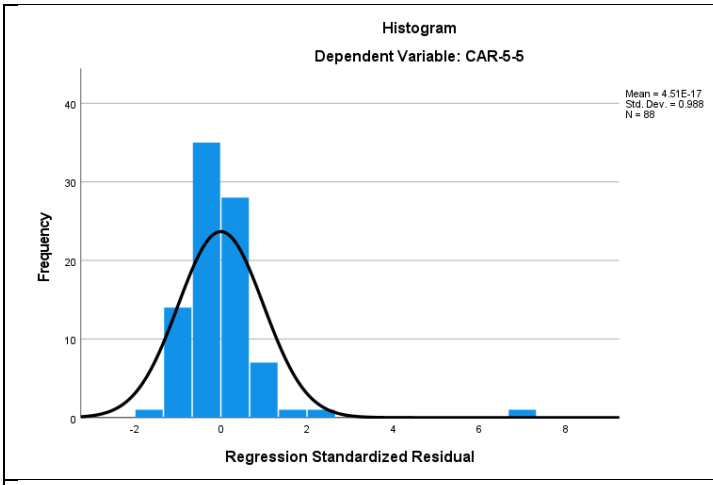
Chi-Square	df	Sig.
27.939	4	<.001

a. Dependent variable: CAAR-2-2

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1 + Age_INC * Age_INC + Age_INC * Ind1 + Ind1 * Ind1

Appendix 2. Normality, homoscedasticity and non-linear relationship tests for CAAR (-5,+5) DSEI



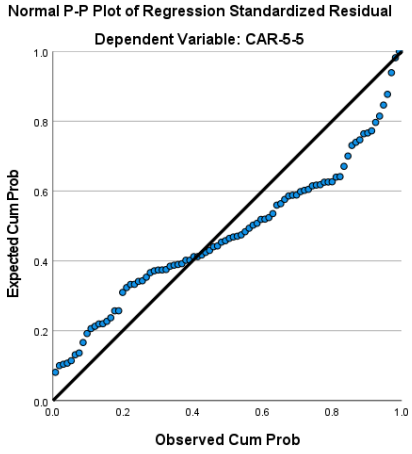
Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
122.677	2	.000

a. Dependent variable: CAR-5-5

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1



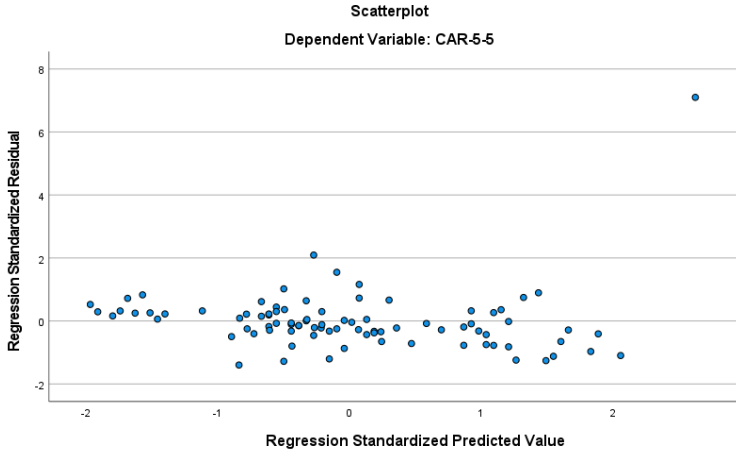
Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
8.018	2	.018

a. Dependent variable: CAR-5-5

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1



White Test for Heteroskedasticity[a,b,c]

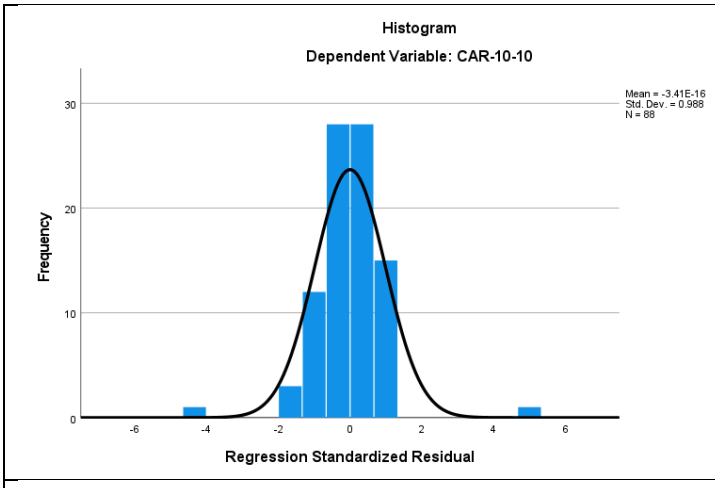
Chi-Square	df	Sig.
28.578	4	<.001

a. Dependent variable: CAR-5-5

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1 + Age_INC * Age_INC + Age_INC * Ind1 + Ind1 * Ind1

Appendix 3. Normality, homoscedasticity and non-linear relationship tests for CAAR (-10,+10) DSEI



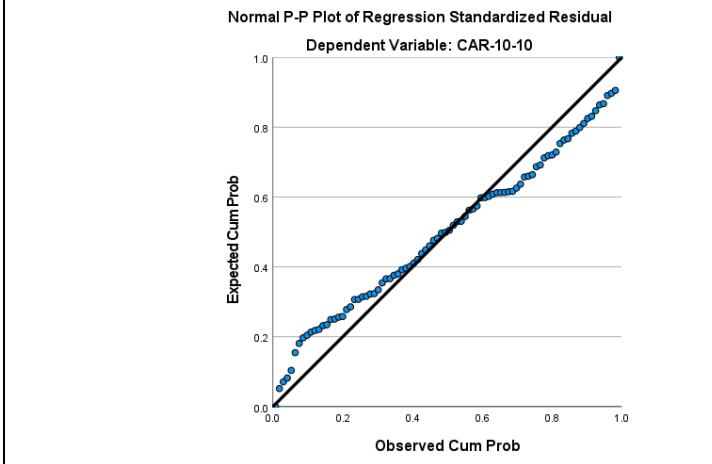
Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
5.899	2	.052

a. Dependent variable: CAR-10-10

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + LnTA + Age_INC



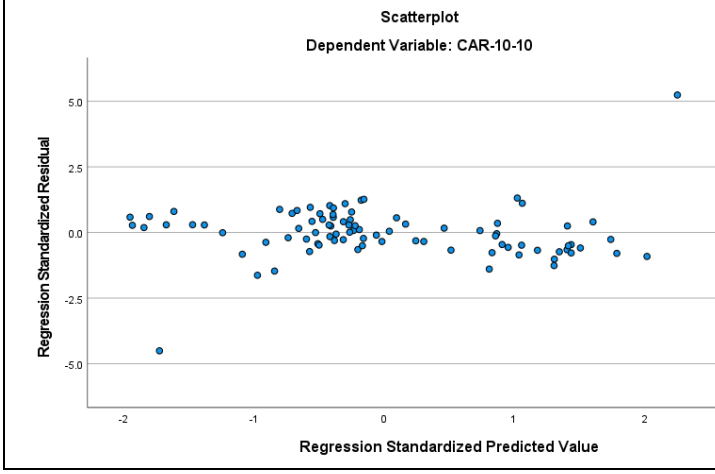
Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
.860	2	.650

a. Dependent variable: CAR-10-10

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + LnTA + Age_INC



White Test for Heteroskedasticity[a,b,c]

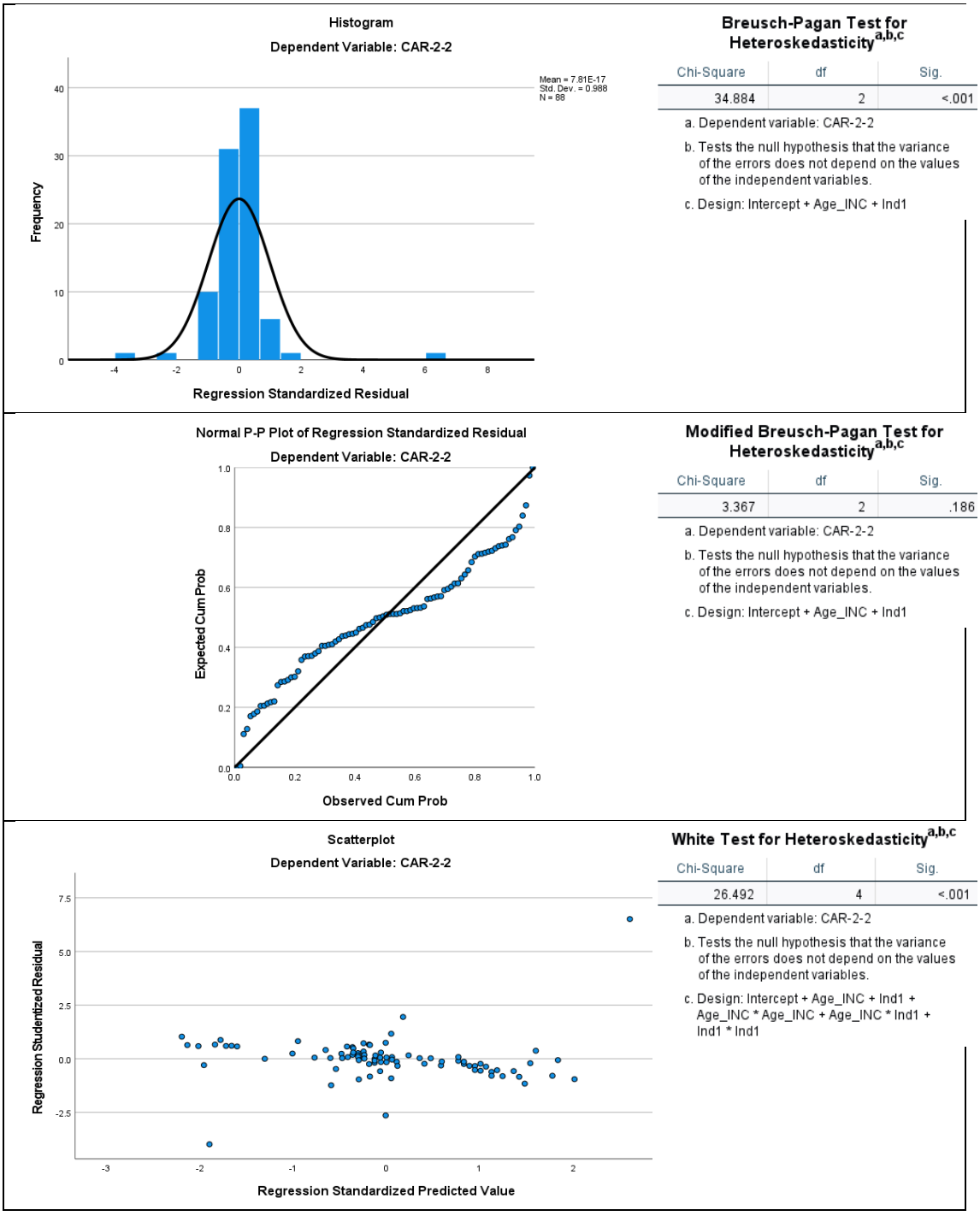
Chi-Square	df	Sig.
15.985	5	.007

a. Dependent variable: CAR-10-10

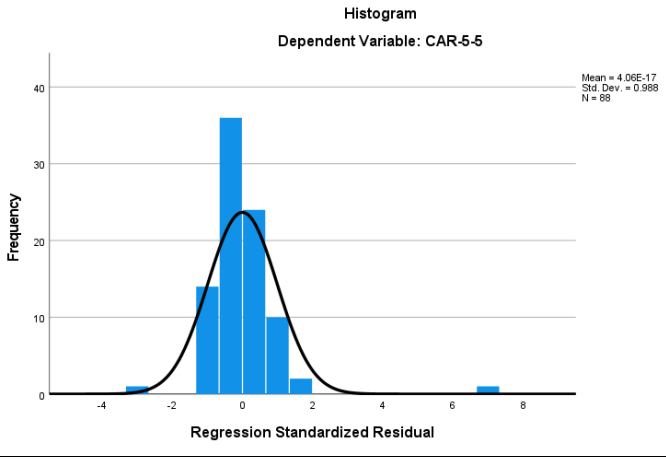
b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + LnTA + Age_INC + LnTA * LnTA + LnTA * Age_INC + Age_INC * Age_INC

Appendix 4. Normality, homoscedasticity and non-linear relationship tests for CAAR (-2,+2 TSI



Appendix 5. Normality, homoscedasticity and non-linear relationship tests for CAAR (-5,+5) TSI



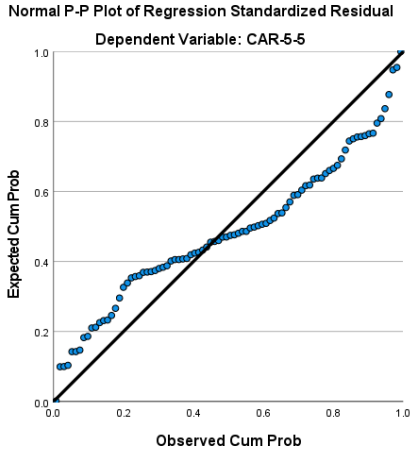
Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
99.946	2	.000

a. Dependent variable: CAR-5-5

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1



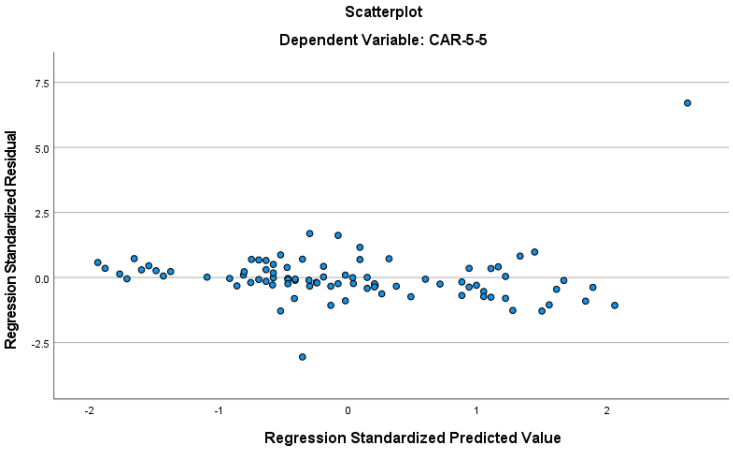
Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
7.950	2	.019

a. Dependent variable: CAR-5-5

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1



White Test for Heteroskedasticity[a,b,c]

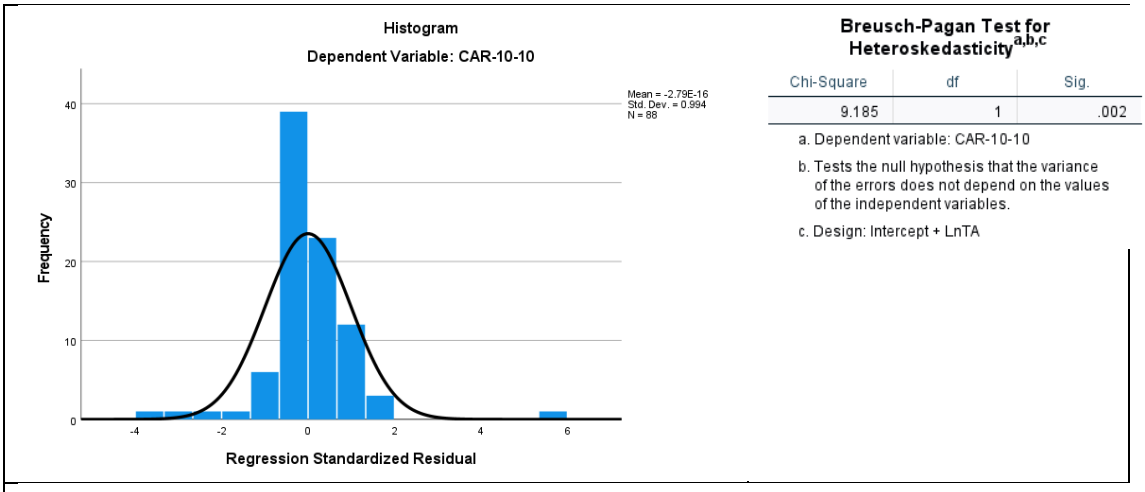
Chi-Square	df	Sig.
27.350	4	<.001

a. Dependent variable: CAR-5-5

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Age_INC + Ind1 + Age_INC * Age_INC + Age_INC * Ind1 + Ind1 * Ind1

Appendix 6. Normality, homoscedasticity and non-linear relationship tests for CAAR (-10,+10) TSI



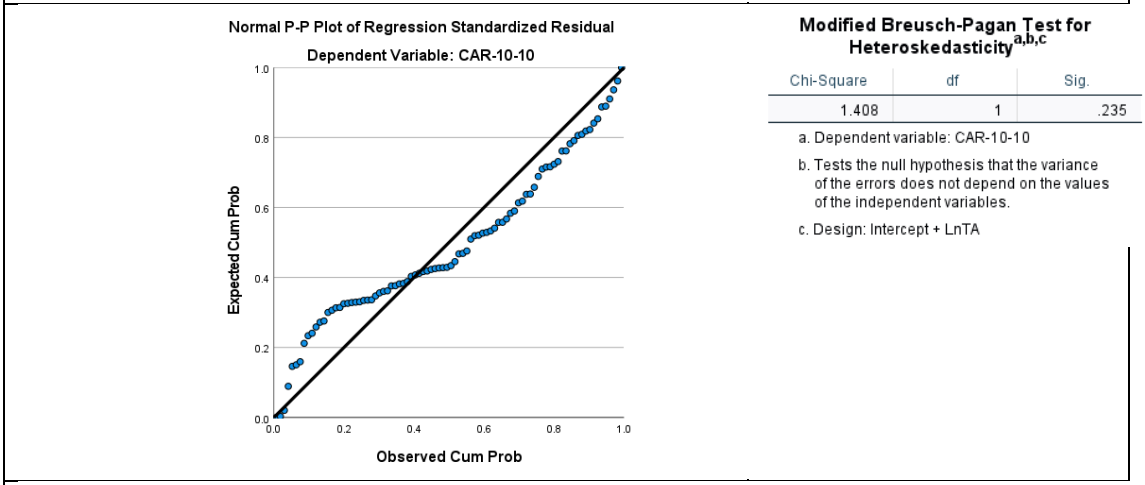
Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
9.185	1	.002

a. Dependent variable: CAR-10-10

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + LnTA



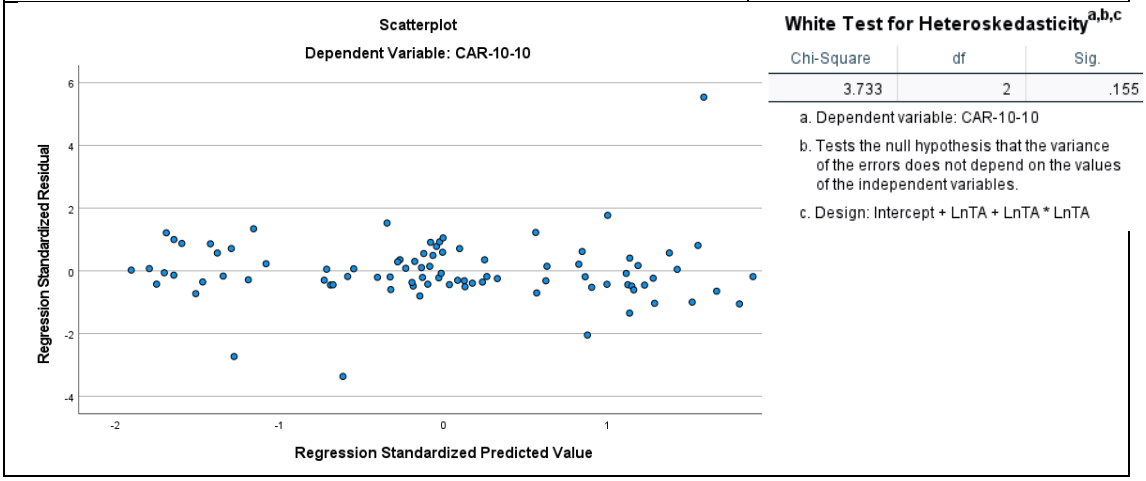
Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
1.408	1	.235

a. Dependent variable: CAR-10-10

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + LnTA



White Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
3.733	2	.155

a. Dependent variable: CAR-10-10

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + LnTA + LnTA * LnTA

Appendix 7. Research clearance letter

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.out.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201400290

25th August 2022

Regional Administrative Secretary (RAS),

Dar es salaam Region,

P.O.Box 5429,

DAR ES SALAAM.

RE: RESEARCH CLEARANCE

The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. KALANJE, James Charles, Reg No: PG201400290** pursuing **Doctor of Philosophy (PhD).** We here by grant this clearance to conduct a research titled **"Stock Price Response to Earning Announcements: Evidence from Tanzanian Stock Market"** He will collect his data at in various Banks and Companies as in appendix 1 from 26th August 2022 to 26th February 2023.

In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam.Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours,
THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth S.Bushesha
DIRECTOR OF POSTGRADUATE STUDIES.

S/N	Region	District Council/ Municipality	Name of Organization	Postal Address	Place
1	D'SALAAM	ILALA	BANK OF TANZANIA	2939 D'SALAAM	2 MIRAMBO STREET
2	D'SALAAM	ILALA	CRDB BANK PLC	268 D'SALAAM	AZIKIWE STREET OPPOSITE POSTA MPYA
3	D'SALAAM	KINONDONI	DCB COMMERCIAL BANK PLC	19798 D'SALAAM	DCB HOUSE, MAGOMENI MWEMBECHAI, MOROGORO RD
4	D'SALAAM	ILALA	DAR ES SALAAM STOCK EXCHANGE PLC	70081 D'SALAAM	3 RD FLOOR, NHC CORPORATE OFFICE, KAMBARAGE HOUSE, 6 UFUKONI STREET
5	D'SALAAM	ILALA	JATU PLC	42155 D'SALAAM	PSSSF HOUSE 11TH & 06TH FLOOR SAMORA AVENUE, MOROGORO RD
6	D'SALAAM	ILALA	MAENDELEO BANK PLC	216 D'SALAAM	LUTHER HOUSE, SOKOINE DRIVE
7	D'SALAAM	ILALA	MKOMBOZI COMMERCIAL BANK PLC	38448 D'SALAAM	PLOT NO. 40, MANSFIELE STREET
8	D'SALAAM	KINONDONI	MWALIMU COMMERCIAL BANK	61002 D'SALAAM	MLIMANI TOWER, MEZZANINE FLOOR, SAM NUJOMA ROAD

9	D'SALAAM	KINONDONI	NATIONAL INVESTMENTS COMPANY LIMITED	7465 D'SALAAM	11 SERENGETI ROAD, MIKOCHENI B
10	D'SALAAM	ILALA	NMB BANK PLC	9213 D'SALAAM	OHIO STREET/ALI HASSAN MWINYI ROAD
11	D'SALAAM	ILALA	PRECISION AIR SERVICES PLC	70770 D'SALAAM	DIAMOND PLAZA,1ST FLOOR, PLOT NO 162/38, MIRAMBO STREET/SAMORA AVE
12	D'SALAAM	KINONDONI	SWALA OIL AND GAS (TANZANIA) PLC	105266 D'SALAAM	2ND FLOOR OYSTER PLAZA PLOT NO. 1196-OYSTERBAY HAILE SELASSIE ROAD
13	D'SALAAM	ILALA	SWISSPORT TANZANIA PLC	18043 D'SALAAM	1ST FLOOR, SWISSPORT FREIGHT TERMINAL, JNIA
14	TANGA	TANGA	TANGA CEMENT COMPANY PLC	5053 TANGA	PONGWE FACTORY AREA, KOROGWE ROAD,
15	D'SALAAM	ILALA	TANZANIA CIGARETTE COMPANY LTD	40144 D'SALAAM	PLOT NO. 20, NYERERE ROAD
16	D'SALAAM	UBUNGO	TANZANIA PORTLAND CEMENT COMPANY LTD	1950 D'SALAAM	WAZOHILL

17	MBEYA	MBEYA DISTRICT COUNCIL	TATEPA PLC	700 TUKUYU	TUKUYU TOWNSHIP, KATUMBA FACTORY
18	D'SALAAM	ILALA	TANZANIA BREWERIES PLC	9013 D'SALAAM	UHURU STREET, MCHIKICHINI, PLOT 79, BLOCK "AA"
19	D'SALAAM	KINONDONI	TCCIA INVESTMENTS	72678 D'SALAAM	LAPF MILLENIUM TOWER 2, 24TH FLOOR, OPPOSITE MAKUMBUSHO VILLAGE.
20	D'SALAAM	ILALA	TOL GASES LTD	911 D'SALAAM	4B NYERERE ROAD 123
21	D'SALAAM	KINONDONI	VODACOM TANZANIA LTD	2369 D'SALAAM	15TH FLOOR, VODACOM TOWER, URSINO ESTATE, PLOT NO. 23, BAGAMOYO ROAD
22	D'SALAAM	ILALA	YETU MICROFINANCE BANK PLC	75379 D'SALAAM	KIUNGANI STREET, 2ND FLOOR MKUNAZINI BUILDING